

A Dissertation on
A CLINICAL STUDY ON SECONDARY
INTRAOCULAR LENS IMPLANTATION

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DECLARATION

I hereby declare that this dissertation entitled “**A CLINICAL STUDY ON SECONDARY INTRAOCULAR LENS IMPLANTATION**” is a bonafide and genuine research work carried out by me under the guidance of Dr.A.RAJENDRAPRASAD M.S., D.O., Professor of Ophthalmology, Coimbatore Medical College, Coimbatore.

Date:

Place:

Dr. G. RASHMI

CERTIFICATE BY THE GUIDE

This is to certify that the dissertation “**A CLINICAL STUDY ON SECONDARY INTRAOCULAR LENS IMPLANTATION**” is a bonafide research work done by **Dr.RASHMI.G**, Post Graduate in M.S. Ophthalmology under my direct guidance and supervision to my satisfaction, in partial fulfillment of the requirements for the degree of M.S.Ophthalmology

Date:

PROFESSOR & CHIEF

Date:

PROFESSOR & HEAD OF DEPT.

DEPT. OF OPHTHALMOLOGY

Date:

THE DEAN

COIMBATORE MEDICAL COLLEGE

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Date:

Place:

DR.G. RASHMI

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ABBREVIATIONS

ICCE	–	INTRACAPSULAR CATARACT EXTRACTION
ECCE	–	EXTRACAPSULAR CATARACT EXTRACTION
IOL	–	INTRAOCULAR LENS
ACIOL	–	ANTERIOR CHAMBER INTRAOCULAR LENS
PCIOL	–	POSTERIOR CHAMBER INTRAOCULAR LENS
CME	–	CYSTOID MACULAR OEDEMA
PMMA	–	POLYMETHYLMETHACRYLATE
RSM	–	RELATIVE SPECTACLE MAGNIFICATION
TSPCIOL	–	TRANSSCLERAL POSTERIOR CHAMBER INTRAOCULAR LENS
NSAIDs	–	NONSTEROIDAL ANTI-INFLAMMATORY DRUGS
RD	–	RETINAL DETACHMENT
IOP	–	INTRAOCULAR PRESSURE
BCVA	–	BEST CORRECTED VISUAL ACUITY
AC	–	ANTERIOR CHAMBER
WL	–	WOUND LEAK
SK	–	STRIATE KERATOPATHY
CE	–	CORNEAL EDEMA
AC SH	–	ANTERIOR CHAMBER SHALLOW
AU	–	ANTERIOR UVEITIS
PC	–	PUPILLARY CAPTURE
ID	–	IOL DECENTRATION

G	–	GLAUCOMA
VH	–	VITREOUS HAEMMORHAGE

ABSTRACT:

AIM: To analyse the visual outcome & complications in secondary intraocular lens implantation.

METHODS: A prospective clinical study was done in 30 aphakic patients who underwent secondary intraocular lens implantation in the posterior chamber. 17 patients had total absence of capsular remnants and underwent scleral fixation intraocular lens implantation. 10 patients had partial capsular remnants and they underwent ciliary sulcus fixation intraocular lens implantation. 3 patients had intact posterior capsule and underwent in the bag posterior chamber intraocular lens implantation. These patients were followed up for 6 weeks post operatively.

RESULTS: 83% of patients had BCVA of 6/9 and above after 6 weeks postoperatively. 3% of patients had BCVA of 6/24 and 13% of patients developed BCVA 6/36 and less. Minor complications like striate keratopathy, corneal oedema and anterior uveitis was seen and subsided with treatment. 1 patient had hyphema which resolved spontaneously. 1 patient had increased intraocular pressure for 1 week and was controlled with anti-glaucoma medications. 1 patient had persistent corneal oedema, 2 patients developed cystoid macular oedema and 1 patient developed retinal detachment.

CONCLUSION: Secondary intraocular lens implantation in the posterior chamber is a safe and effective method of correcting aphakia and avoids the disadvantages associated with aphakic spectacles and contact lens.

INTRODUCTION

Secondary intraocular lens implantation refers to intraocular lens insertion at a time remote from the initial cataract extraction (or less commonly, from the trauma that led to the loss of the lens).¹

Cataract is the commonest age related disease in most countries worldwide. There are approximately 45 million blind people in the world. At least 80% of these people live in developing countries and more than half are blind as a result of cataract.² It is estimated that in India alone, more than 5.1 million patients undergo cataract surgery in a year.³

There are a variety of cataract extraction methods, including phacoemulsification, extracapsular cataract extraction and intracapsular cataract extraction.⁴

The intracapsular method of cataract extraction was the preferred technique for nearly 50 years. However, the momentum shift towards ECCE probably began in 1967.⁵

In intracapsular cataract extraction (ICCE), the lens is removed along with the capsule and in Extracapsular cataract extraction (ECCE), posterior capsule is spared.⁶ Since 1970, phacoemulsification and extracapsular cataract surgery have replaced intracapsular cataract, except for rare instances, such as subluxated lenses or eyes in which a question of patient sensitivity to lens material exists.⁷ However placement of a posterior chamber intraocular lens may

not be possible in all eyes that undergo this procedure, due to unforeseen complications that may occur intraoperatively.³

Modern cataract surgery involves phacoemulsification of the opacified crystalline lens and the implant of an intraocular lens (IOL) in the capsular bag. In some conditions this is not possible due to the type of cataract (e.g., traumatic cataracts with lens subluxation, cataracts in pseudoexfoliative syndrome with zonular/capsular dehiscence) or to systemic and congenital disorders characterized by weakness of zonules/capsule (e.g., familial or idiopathic ectopia lentis, Marfan syndrome, etc.) or to intraoperative complications (e.g., large breaks of the posterior capsule, accidental aspiration of the capsular bag, etc.) leaving the patient aphakic.⁸

Aphakia can be corrected by either spectacle lens, contact lens or intraocular lens. The insertion of an intraocular lens within the aphakic eye overcomes the optical disadvantages of aphakic spectacles and the handling and wearing difficulties encountered with contact lens.^{9, 10}

An IOL can be placed in the anterior chamber between the cornea and iris, as in iris-fixated and closed- or open-loop anterior chamber IOLs (AC IOLs), or it can be implanted in the posterior chamber within the ciliary sulcus posterior to the iris, as in sutured iris-fixated and sclera fixated posterior chamber IOLs (PC IOLs).¹¹

The preferred lens for aphakic rehabilitation is a posterior chamber lens. Major therapeutic advantages of a posterior chamber IOL over anterior chamber IOL are

1. A PCIOL is closer to the focal point of the eye reducing the image magnification.
2. Its position away from delicate anterior chamber structures especially the corneal endothelium and anterior chamber angle.
3. The risk of CME, glaucoma and corneal oedema is lower with PCIOLs^{12,13}

This study is done to analyse the secondary intraocular lens implantation in the posterior chamber.

REVIEW OF LITERATURE

Secondary intraocular lens implantation is defined as insertion of an IOL into an eye which is rendered aphakic by prior cataract extraction by any method, or by an exchange of IOL, which is a special case of secondary IOL implantation.²⁰

INDICATIONS

1. Monocular aphakia
 - a. Spectacle or contact lens intolerance
 - b. Old and disabled persons with Parkinsonism, tremor and other physical disability which makes handling and using of spectacle or contact lens difficult.
 - c. Occupational and circumstantial situations where spectacle or contact lens is not suitable or cumbersome, e.g. athletes, dancers, etc.
2. Contralateral pseudophakia
 - a. Aborted primary IOL implantation
 - b. Bilateral aphakia in children
 - c. Corneal decompensation due to ACIOL
 - d. In combination with other procedures like pars plana lensectomy for dislocated crystalline lens treatment, penetrating keratoplasty, or trabeculectomy.

HISTORY OF INTRAOCULAR LENS IMPLANTS:

In early 18th century there have been abortive attempts of IOL implantation.

The modern era began with observations made during World War II. The apparent lack of reactions to PMMA fragments in eyes of fighter pilots was impressive.¹⁵

In 1949, Ridley implanted his first PMMA IOL in a 45 year old woman into the posterior chamber of the eye after ECCE.²¹ The long term results of this IOL was disappointing because of downward decentration, anterior dislocation and posterior dislocation.

Anterior chamber angle fixated lenses were designed because of difficulties encountered with Ridley's posterior chamber lenses. On May 13, 1952 Baron's modified ACIOL was implanted by Strampelli.²² Several modifications were made to decrease the complications associated with ACIOLs.

Anterior chamber IOLs were easy to insert but it demanded correct sizing and positioning so that haptics rested at the sclera spur.

Epstein & Binkhorst revised lens implant surgery by developing iris fixation lenses. In 1957 Binkhorst developed iris clip lens and implanted on August, 11 1958.^{23, 24}

This was usually used with an ICCE and later variations were made in the shape, length, and insertion of the haptic loops.

The iris clip lens prevents fixation in the chamber angle & in the posterior chamber. Thus the complications of corneal damage with ACIOL and possibility of dislocation with positioning of implant behind the iris was lessened.²⁵

Modifications of iris clip lens were made by Fyodorov and Copeland in 1964 and 1968 respectively.²⁷

In 1969, Worst sutured one of the anterior loops of the iris to prevent dislocation of iris clip lens. Binkhorst placed the iris-clip lens vertically rather than in horizontal position in 1970. Variations in iris fixated lens were also made to overcome the complications.²²

It was realised that an extracapsular cataract extraction would yield better results than intracapsular extraction by Binkhorst work.

Pearce in England demonstrated the feasibility of posterior chamber fixation. In 1977 he sutured a 4mm optic tripod suture to iris for secondary fixation.

Sherring in 1978 designed J-loop posterior chamber lens which was a modification of Barraquer anterior chamber lens.²⁵ This could be fixated in the

capsular bag or ciliary sulcus and provided lowest complication rate. A series of modifications of the original shearing lens was made with PMMA optics.

The optic material of the original Ridley lens is still used in most IOLs usually. This is made up of poly methylmethacrylate (PMMA).

PMMA is inert and well tolerated with in the eye. It is a light, durable material with a specific gravity of 1.19 and refractive index of 1.49.²⁸

The most important change in design is in the introduction of single-piece PMMA lenses. There is no loop optic junction thus decreasing the risk for adherence of inflammatory cells. The flexibility of PMMA lens increase by increasing the loop length. Thus making it easier during implantation of the loop and decreasing the possibility of breaking the loop during handling.

The most important advantage of a single piece PMMA lens is its ability to achieve excellent centration.

CORRECTION OF APHAKIA

The natural crystalline convex lens of the eye has an effective power of approximately +20dioptries. Removal of the cataractous lens therefore leaves the eye with a large refractive error.

There are 3 options for correction of aphakia

1. Spectacle lens
2. Contact lens
3. Intraocular lens¹⁴

Spectacle lens

Spectacle lenses were better accepted 50 years ago than today as no other method of optic correction was available¹⁵. All spectacle wearers have to contend with several problems due to high refractive power of the lens required (approx. +10D or more).

The relative spectacle magnification (RSM) produced by aphakic spectacle correction is approximately 1.33. This means that the image produced in the corrected aphakic eye is one third (25 to 30%) larger than the image formed in emmetropic eye. This magnification causes the patient to misjudge distances. Objects appear to be closer to the eye than they really are because of the increased visual angle subtended at the eye.¹⁴

Spectacle correction in unilateral aphakic eye can achieve a clear retinal image, but with a relative spectacle magnification of 1.33 the image in the aphakic eye is one third larger than the image in the normal fellow eye. The patient is unable to fuse images of such unequal size (anisesokonia) and complains of seeing double.¹⁴

The lenses used in aphakic spectacles are subject to the aberrations. In particular, image distortion is very troublesome to the newly aphakic patient. Straight lines appear curved (pin cushion effect).²⁹

The prismatic effect of aphakic spectacle lenses produces a ring scotoma all around the edge of the lens causing the patient to trip over unseen obstruction in their path.^{29, 30}

These high powered lenses are heavy and uncomfortable to wear.

The foregoing aberrations and prismatic effects can be eliminated by contact lens or intraocular lens implant.

Contact lens

Linkszt cited the following advantages

1. No significant magnification (only 7%)
2. No appreciable spherical aberration, no pin cushion distortion
3. No ring scotoma, no jack in the box phenomenon and full peripheral vision³¹

Contact lens is more practical in young aphakic patients than in elderly. The main disadvantage in most elderly patients is they do not possess the manual dexterity to insert and remove them.¹⁵

Intra ocular lens

The insertion of an intraocular lens within the aphakic eye overcomes the optical disadvantages of aphakic spectacles and the handling and wearing difficulties encountered with contact lenses. The IOL becomes part of the optical system of the eye, and because it is situated at or very close to the position of crystalline lens, problems with RSM do not arise.¹⁴

CLASSIFICATION OF SECONDARY INTRAOCULAR LENSES

The four principal alternatives for fixation of secondary IOLs:

1. Standard capsular bag-fixated or sulcus-fixated posterior chamber(PC) lenses
2. Transscleral suture-fixated PC lenses
3. Peripheral iris suture-fixated PC IOLs
4. Anterior chamber (AC) lenses.¹⁶

If capsular support is available standard PC lenses placed in the ciliary sulcus or, preferably, in the capsular bag are the standard of care. If capsular support is absent, three primary options exist for IOL fixation in the absence of capsular support: transscleral-sutured PC IOLs, peripheral iris sutured PC IOLs and flexible open-loop ACIOLs.¹⁵

POSTERIOR CHAMBER INTRAOCULAR LENSES

The posterior chamber is the normal anatomic position of crystalline lens. Thus the ideal location for an IOL placement is within the capsular bag.¹⁷

The posterior chamber is bounded by

1. The ciliary processes and the clefts between them
2. The lens, resting in its capsular bag and the lens suspensory ligament and
3. The pigment epithelium of the iris.¹⁸

Advantages of PCIOL is reduced risk of complications associated with ACIOL like bullous keratopathy, damage to anterior chamber angle structures, pupillary block glaucoma and pseudophakodonesis. It stabilises the ocular contents and decreases complications like iritis, CME and retinal detachment.¹⁸ Positioning the lens closer to the nodal point and centre of rotation of the eye is associated with superior optical properties.¹⁹

However, placement of a secondary IOL within the capsular bag is technically difficult because of the anterior and posterior capsular fusion secondary to fibrosis.¹⁷

Secondarily implanted PCIOLs may be left unsutured in eyes that have intact capsular support.¹⁵

Surgical Technique

A 7 mm limbal incision is made. Anterior vitrectomy done and a viscoelastic material is injected into the capsular bag such that bag becomes

well inflated. The sterile lens is placed in the bag by passing the leading loop of the haptic into the inferior capsular fornix. The trailing loop is left protruding from the wound. The loop is flexed until convexity can be passed under the superior edge of anterior capsule in the edge. The lens is then dialled into the capsular bag.

CILIARY SULCUS FIXATION INTRAOCULAR LENS

The ciliary sulcus is a slightly avascular area situated below posterior surface of iris and anterior capsule of lens^{32, 33}. An IOL placement in this area is only slightly stable because of the surrounding structures and the anatomic variations.^{25, 32} Ciliary sulcus fixation of secondary PCIOL implantation requires at least peripheral capsular support and intact zonular support.³⁴

Study by Duffey et al, showed that the most likely location of ciliary sulcus is 0.94 mm behind the posterior surgical limbus in vertical meridian and 0.5 mm in horizontal meridian.

Bellucci et al, found that when the scleral fixation lens was sutured 1.5-2.0 mm from limbus, 6 haptics were in ciliary sulcus, 6 in pars plana and 2 in the iris root.

Advantages of ciliary sulcus fixation include easy surgery, safer in eyes with disorder associated zonular nucleus and when zonular dialysis or capsular rupture is seen intraoperatively.²⁵

Disadvantages

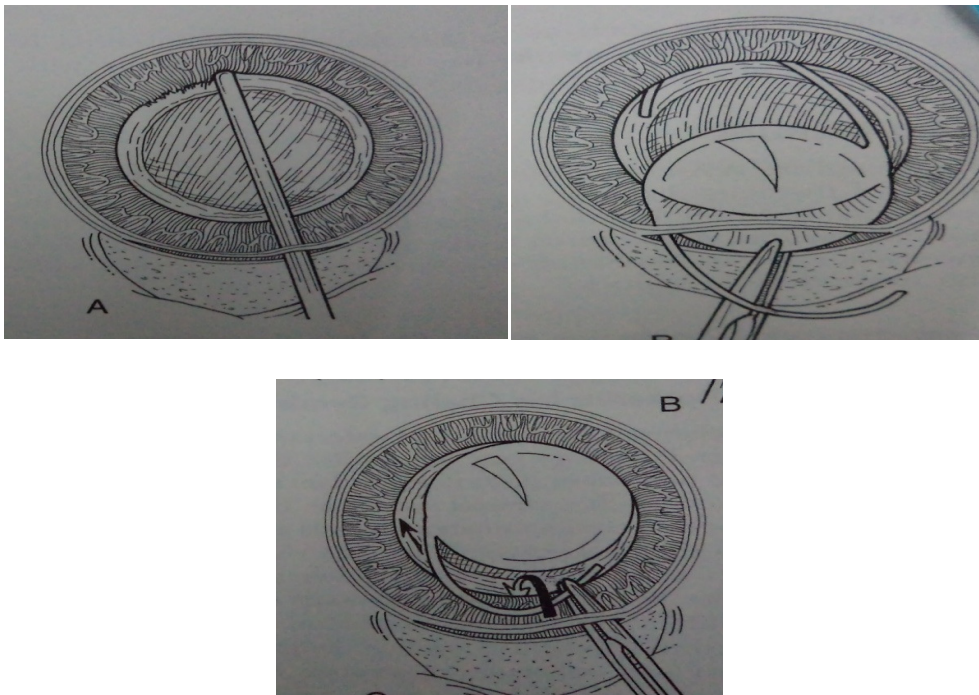
Complications of ciliary sulcus fixation of IOL resulted from contact by the lens with posterior surface of iris and ciliary body.

1. Decentration of the lens is due to postoperative inflammation and posterior synechiae.
2. Pupil capture in which part or all of the optic displaces anterior to iris resulting in synechiae.

3. Posterior iris chafing syndrome due to anteriorly angulated IOL loops that rub against the posterior surface of iris. It is manifested with iris transillumination defects and transient microhyphemas with visual obscuration's (transient ischemic amaurosis).³⁵
4. Erosion and perforations of the ciliary body resulting in haemorrhage or thrombosis.

Surgical technique

A 7 mm limbal incision is made and viscoelastic material is injected between the iris and capsule, synechiae between the posterior surface of the iris and the capsule is released with microscissors or a blunt spatula. The lens is inserted between the iris and the capsular remnants. Lens centration and stability of IOL assessed. Viscoelastic from the anterior chamber is removed and wound closed.



TRANSSCLERAL SUTURE FIXATED PCIOIOL

The development of novel technique for fixating an IOL in the aphakic eye was introduced in 1980s.

Suturing an IOL to sclera was first described by Girard in 1981 and modified later by Malbran and colleagues in 1986.³⁶

The ciliary sulcus placement of haptic is considered best for transscleral fixation of PCIOIOL because of its stable fixation avoiding major arterial circles of the iris, ciliary processes and trabecular meshwork.³⁷

Malbran's original technique first described two point scleral fixation. Subsequently, one- , three- and four point fixation was described.³⁸

Transscleral sutures can be placed vertically, obliquely or horizontally except at 3 and 9 o'clock position because of danger of injuring long ciliary arteries and nerves.³⁹

Advantages

1. Includes advantages of non-sutured PCIOIOLs
2. Used with limbal wound or penetrating keratoplasty
3. Not dependent on presence of iris tissue
4. Limited pseudophacodonesis
5. Minimises uveal contact
6. Vitreous supported by lens

Disadvantages

1. Technically difficult to insert

2. Increased operating time
3. Extensive vitrectomy often required
4. High chance of suture related problem
5. Epithelial down growth from suture path
6. Risk of retinal detachment
7. Risk of suture passage through ciliary body
8. Ciliary body erosion
9. Long term dependence on fixation of the lens by a suture

Surgical technique

With respect to the technique, there are several variations in the procedure:

1. The method of introducing suturing needles- ab externo or ab interno
2. The method of securing the haptic with the fixating suture
3. The number of points of PCIOL fixation
4. The method of avoiding suture or knot erosion

Scleral sutured lenses can be sutured from outside in (ab externo) or by passing the needle from inside out (ab interno).

AB EXTERNO TWO POINT FIXATION TECHNIQUE

In 1991, Lewis published ab externo sulcus fixation of PCIOL.⁴⁰

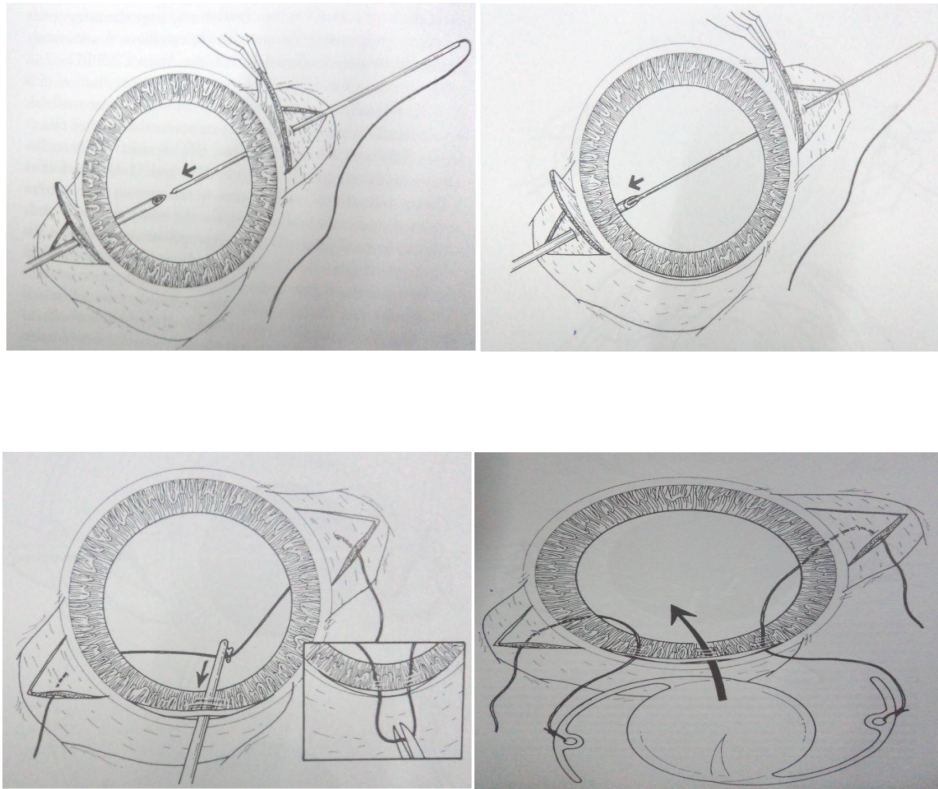
Ab externo technique avoids the passage of the needle from inside out thereby decreasing the risk of haemorrhage, retinal detachment and lens malpositions.

Disadvantages of Lewis method is less stable IOL fixation because of one point fixation of suture to sclera compared with two point fixation.

The steps involved in the procedure are:

1. Superior conjunctival peritomy is created from 4 o' clock to 10 o' clock position
2. Partial thickness triangular sclera flap of 3×2 mm is created at 4 and 10 o' clock positions
3. A 7 mm corneal scleral wound is made and complete anterior vitrectomy performed
4. Anterior chamber and retropupillary space is filled with viscoelastic
5. A straight needle with 10-0 polypropylene suture is passed through 10 o' clock sclera bed, 0.8 to 1 mm posterior to posterior surgical limbus parallel to iris
6. Needle is passed behind the iris till it is visualised behind the pupil
7. A 28 gauge needle is inserted through 4 o' clock sclera bed
8. Straight needle is inserted into the barrel of 28 gauge needle and syringe is withdrawn from the eye
9. Loop of suture is withdrawn through the corneal scleral wound using a hook

10. Loop of suture is cut and each end is tied to the haptic of the IOL
11. IOL is placed in the sulcus and rotated into its position
12. A second 10-0 prolene suture is used to take a bite just anterior to the original suture exit point in the scleral bed. The long end of the second prolene suture is tied to both its short end and the lens-fixing suture
13. This is repeated at the other end
14. The sclera flap and conjunctival peritomy is closed⁴¹

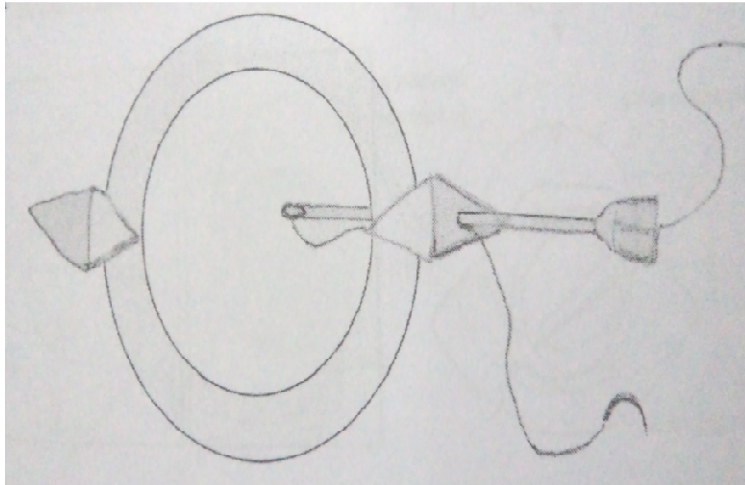


Variations

Direct ab externo insertion of sutures

In this method, separate sutures are passed on two straight needles into the eye, one each through the scleral beds at 4 and 10 o'clock. The needles are passed directly through the superior corneoscleral wound and tied to the IOL.⁴²

Basti et al modified this method, instead of passing direct needle; he used 26 gauge hollow needles through which free end of polypropylene suture is passed. The hollow needle is passed ab externo through sclera and ciliary sulcus. The suture was withdrawn from the main incision with McPherson forceps. Main advantage of this method is, it requires routinely available materials.⁴³



Small incision technique^{44, 45}

This method used a small incision and a foldable PCIOL

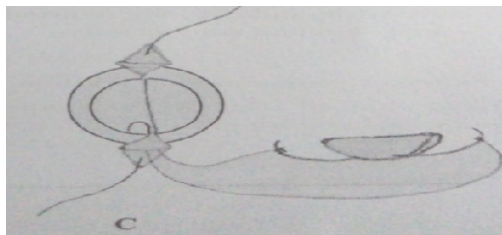
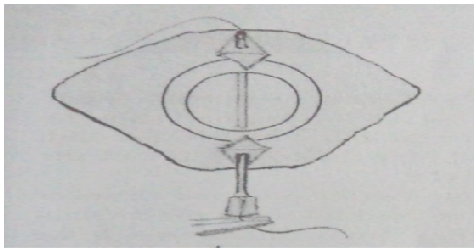
1. Two 5 mm peritomy and two 3×3 mm triangular half thickness sclera flaps are made 180° apart
2. A 25 gauge needle is passed through one scleral bed to other
3. Cut end of the suture is threaded through the full length of the needle and withdrawn
4. A 3.5 mm self sealing incision is made through superior scleral bed
5. Through kuglen hook prolene suture is retrieved out and cut and sutured to the haptics
6. The IOL is folded and then inserted through superior incision
7. Rest of the steps are same as above

Regillo and Tidwell and Tsai and Tseng also described small incision techniques by modifying Lewi's original method.

Advantages⁴⁶

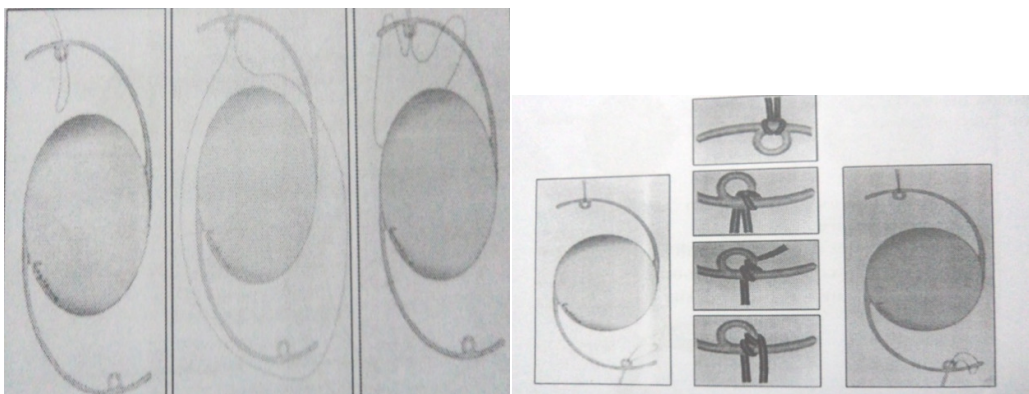
1. No large corneal/scleral incision
2. No external corneal or scleral sutures, practically making sutureless surgery
3. Early visual rehabilitation
4. Intraoperative hypotony and globe collapse can be avoided with anterior chamber maintainer
5. Four point scleral fixation make IOL stable and avoid IOL tilt

6. All IOL sutures are below scleral flap avoiding suture erosion and knot related inflammation
7. Not much conjunctival handling so healthy conjunctiva can be spared for future trabeculectomy or even avoid bleb
8. Greatly reduces surgical time with a resultant reduction in postoperative inflammatory response.



Haptic looping method⁴⁷

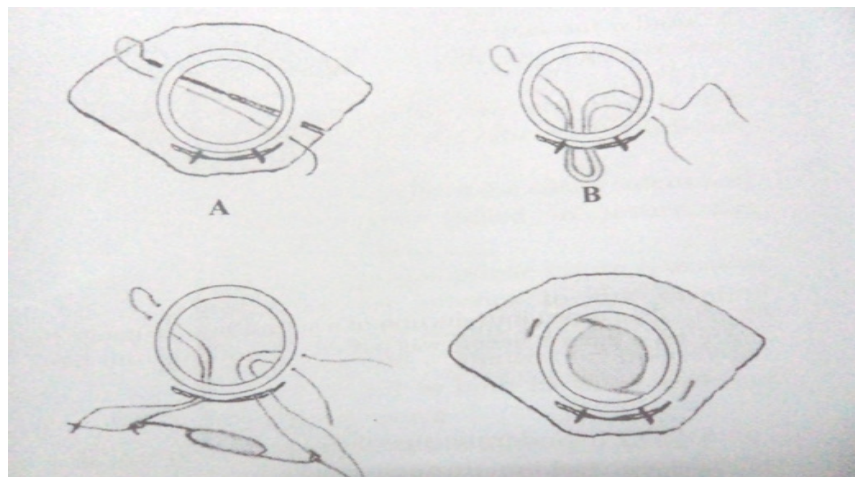
1. A superior corneoscleral wound is created. Peritomies and sclera flaps are created at 2 and 8 o' clock positions
2. 1mm posterior to the limbus, a straight needle is passed into the globe to make a port and withdrawn. It is again inserted in the reverse position with attached 10-0 prolene suture
3. Suture is pulled out through the corneoscleral wound using a lens dialer
4. This is repeated at the opposite scleral bed
5. Suture loop is passed through the haptic eyelet. At one end, suture loop is passed over the IOL and at the other end loop is passed over the haptic to lock the suture over the eyelet
6. The IOL is implanted in the posterior chamber
7. Needle is passed through scleral bed and suture is tied and cut long.



Ab Externo Continuous-loop Fixation³⁸

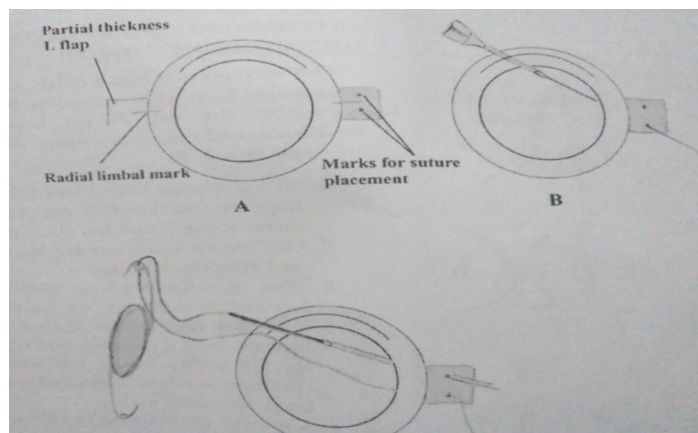
This method allows burying of the knot and does not require a scleral flap, but it can cause torque and tilt.

1. A peritomy is made from 4-10 o' clock and a superior corneoscleral wound is created
2. A straight needle with 10-0 prolene suture is passed from one sclera bed to other, 1 mm from the limbus
3. The needle is turned around and passed back into the sclera bed emerging through the original scleral bed
4. Both sutures are withdrawn and cut
5. One cut end at each side is passed through the corresponding eyelets and the sutures are tied to themselves
6. The lens is placed in the sulcus and long loops are cut, shortened and tied
7. The final knot is then rotated into the eye



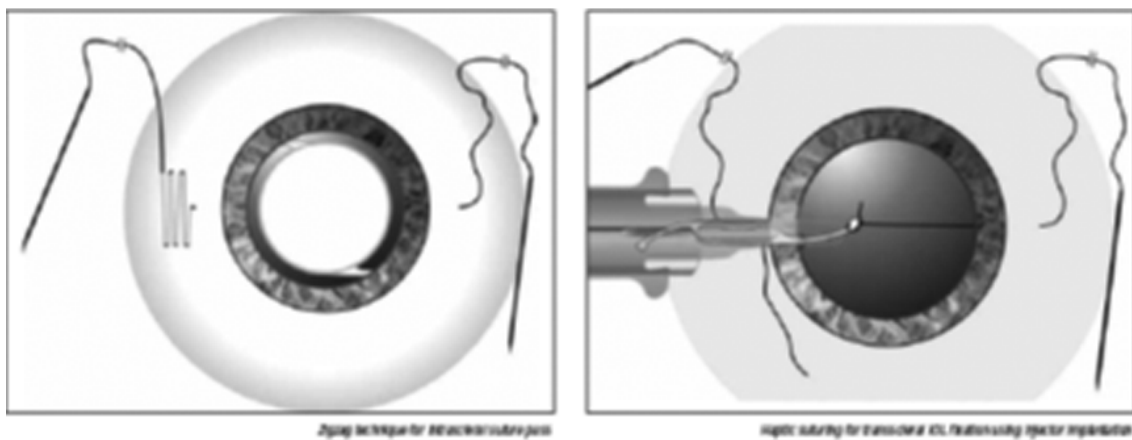
Ab Externo Continuous-loop Fixation with Scleral Flaps⁴⁸

1. Conjunctival peritomies are created at 3 and 9 o' clock position
2. 7 mm clear corneal incision is made superiorly
3. At 3 and 9 o' clock positions, L shaped sclera incisions are made with limbal based flaps
4. A 10-0 prolene suture with needle is passed through the sclera bed and retrieved through the superior corneal incision with 27 G needle
5. This suture is threaded to an eyelet of the haptic, and the suture is passed back into the eye through superior corneal incision and through another 27 G needle is guided out through the same sclera bed.
6. Same procedure repeated on the other side
7. IOL is inserted through the superior corneal wound into posterior chamber
8. Sutures are pulled, tightened and sutured. The knot is rotated into the eye
9. Conjunctival and sclera flaps are closed



KNOTLESS TECHNIQUE^{49, 50}

1. A 6-7 mm scleral tunnel incision made at 12 o'clock position
2. A double armed 10-0 polypropylene suture with straight needle was used
3. One straight needle was passed 1.5 mm behind the limbus at 3 o'clock position through full thickness sclera and retrieved through opposite side by 26 G needle
4. The stretched suture is pulled out through sclerocorneal tunnel
5. The suture is cut and suture ends are passed through the eyelets of the IOL and tied
6. The IOL is inserted into the sulcus and sutures pulled
7. The corneoscleral wound is sutured
8. The needle of the 10-0 prolene suture is passed in 'Z' shape with at least 5 indentations to secure the IOL
9. Suture is cut without making any knot and covered with conjunctiva



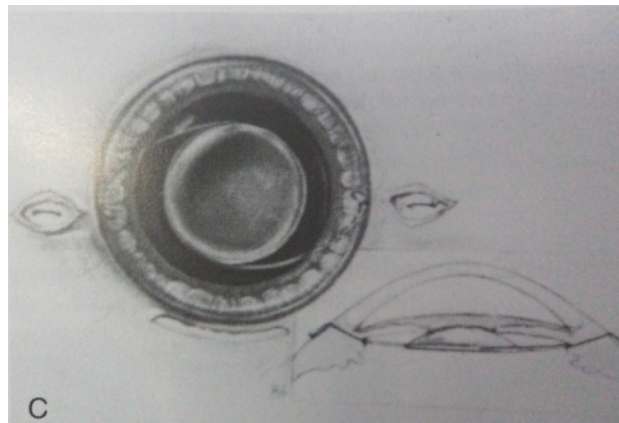
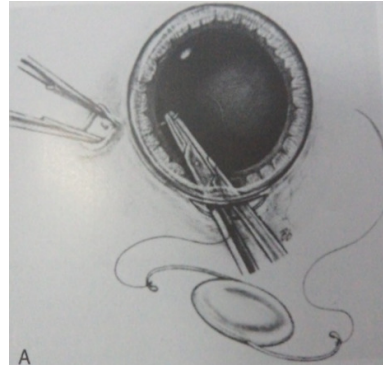
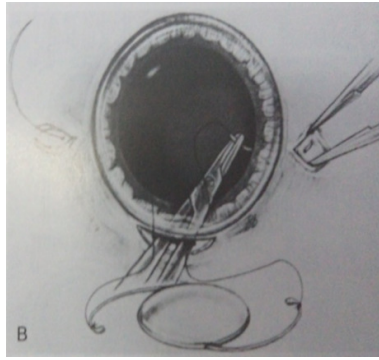
AB INTERNO TWO POINT FIXATION⁵¹

In 1990, Smiddy and colleagues described the technique for implanting scleral fixated posterior chamber IOLs which produced good visual results with a low rate of complications and which was technically straight forward.

The main disadvantage of this method is the risk of haemorrhage associated with passage of needle from inside out through sclera from 3 to 9 o' clock positions.

The basic steps of an ab interno sclera fixation are

1. A double armed polypropylene suture is cut and the ends are tied to the haptics of the IOL with square knots
2. A 8 mm superior peritomy is done with a fornix based conjunctival flap, with a separate radial incisions at 3 and 9 o' clock positions
3. Anterior chamber is entered with a paracentesis knife and anterior vitrectomy performed
4. IOL attached with the sutures are placed in the superior incision site and needle is passed through the incision, pupil, behind the iris and out through the sclera 1mm posterior to the surgical limbus at 3 o' clock
5. The other IOL attached needle is passed through in a similar fashion at 9 o' clock position
6. The suture ends are left long and are laid flat under the conjunctiva and sutured with 8-0 chromic catgut
7. Limbal incision is then closed.



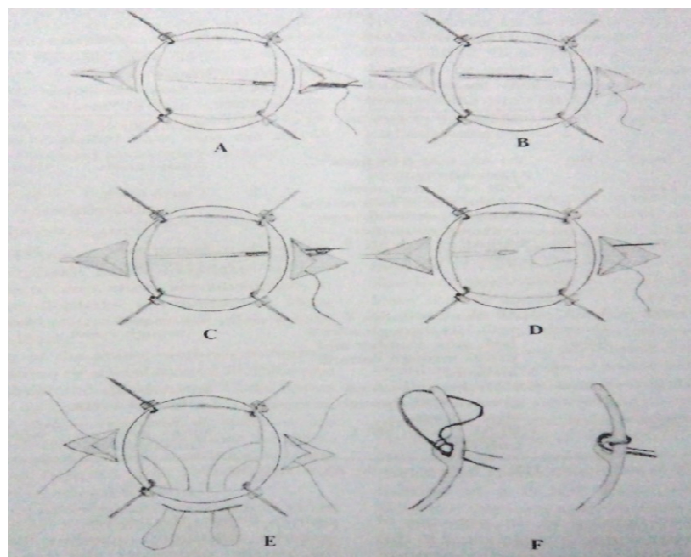
AB INTERNO FOUR POINT FIXATION WITH HAPTIC LOOPING³⁸

This method introduced the use iris hooks to facilitate ciliary sulcus visualisation and also provides a quick way for four point fixation of sutures.

The steps of the procedure are

1. Limbal based triangular scleral flaps are made at 3 and 9 o'clock position
2. Flexible iris retractors are placed at 2,4,8 and 10 o'clock positions
3. A long 27 G bent needle is passed ab externo at 3 o'clock position near limbus. It is pushed till it exits at 9:15 o'clock position ab interno fashion.

4. A straight long needle with 10-0 prolene with blunt end is advanced into the hollow needle. The hollow needle is withdrawn into the vitreous cavity and then slightly turned to direct it towards 8:45 o'clock position and is passed out of the eye
5. The straight needle with the suture is withdrawn from the 27 G hollow needle and then out of the eye
6. A limbal incision is made at 12 o'clock and anterior chamber entered with a blade
7. The intraocular loop is withdrawn from the eye with a hook
8. The above steps of the procedure are repeated from the opposite side
9. Each loop is passed through the eyelets of the haptic and then looped over haptic end
10. The PCIOL is inserted, the sutures tied and the scleral flaps sutured closed



PARS PLANA FIXATION⁵¹

In 1981, Girard described the technique of pars plana fixation which never became popular.

The pars plana is relatively avascular and lies anterior to the retina, thus avoiding the complications of haemorrhage and retinal detachment. Other advantages include avoiding the contact of IOL to iris and pars plicata. Pigment dispersion can also be avoided.

For a pars plana fixation, few modifications in the standard posterior chamber IOL has to be done

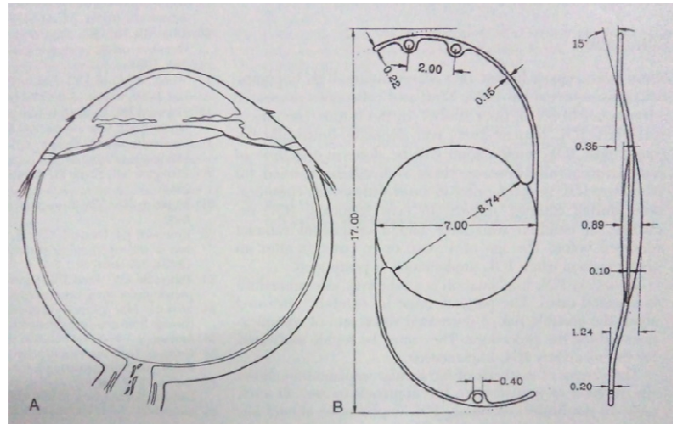
1. The diameter of the lens is increased to about 17 mm and diameter of biconvex optic to 7 mm
2. The haptics are 10 or 20 degrees angled backwards
3. PMMA is the material of choice
4. IOL would preferably have eyelets to facilitate suture fixation. It is best to use three point fixation with one haptic having two eyelets for a stable fixation

The basic steps for Teichmann's pars plana fixation include:

1. Suture is tied around each of the three eyelets of the lens.
2. IOL is then inserted through the superior limbal incision and IOL is oriented either vertically or obliquely
3. The pars plana fixation proceeds from inside out. The ora serrata is situated 5 to 6 mm posterior to the limbus and ciliary body. To enter the

pars plana safely, sclera is entered 3 to 5 mm behind the limbus with the needle being parallel to the iris plane.

4. Two point fixation of the sutures or double transscleral pars plana fixation is used for increased stability of the IOL.



COMPLICATIONS

Complications associated with scleral fixation PCIOL is suture erosion, glaucoma, cystoids macular oedema, retinal detachment, endophthalmitis, lens tilt or redislocation and vitreous hemorrhage.^{52, 53}

Suture erosion

In Solomon's series, suture exposure was the most common complication occurring in 73% of cases.⁵⁴

Suture erosion creates a communication between intra and extraocular environment with resultant microbial contamination.³⁸

Erosion, breaking or wearing of the 10-0 polypropylene occurs due to the lack of fibrous reactions around the IOL haptic.⁵⁵ The incidence of suture erosion ranged from 5% to 50% when sutures were covered with conjunctiva alone. When sutures were covered with sclera flap, incidence was reduced to 11% to 17.9%. Incidence was dropped to 0 to 6.7% when the suture knot was rotated into the sclera.⁵⁴

Suture erosion can be treated by either cutting the free ends flush on the knot, cauterising the knot, using a sclera patch graft or by revising the scleral flap.⁵⁴

IOL tilt/ decentration

Lack of lens capsule support can potentially result in IOL tilt and to decentration. This is associated with oblique astigmatism and myopic shift and lateral shift of focus.³⁸

Small degrees of lens tilt (less than 10°) and decentration (less than 2 mm) are asymptomatic and clinically insignificant.⁵⁴

The incidence of IOL tilt or decentration has been reported to be 5- 10 % in literature. In Mazhri ZU and Qadri WM study incidence of IOL tilt was 8% and only in one patient it was clinically significant. Delayed subluxation occurred in one patient after one and half years postoperatively.⁵⁶

In a study by Ghaseminejed AK and Ahmadieh H, sclera fixated IOL position was good in 72.2% and mild IOL tilt was seen in 16.7%. Due to breakage of one of the sutures, IOL sunset was seen in one eye after 2.5 years.⁵⁷

IOL tilt occurs due to the torque created by the asymmetric suture placement on the lens.⁵⁴

A decentered PCIOL may result from a number of factors. These include asymmetric attachment of haptic sutures; failure of placing the needle 180° apart through the sclera; and suture loosening, breakage, or slippage on the haptics.⁵⁴

Lens malposition can be prevented by use of an IOL with eyelets on the haptics, symmetrically securing the suture to the eyelet and passing the needle equal distance from the limbus and exactly 180° apart.⁵⁴

Hyphema/ vitreous haemorrhage

Suturing PCIOLs required passage of needle through the vascular uveal tissue with an associated risk of bleeding.³⁸ In most of the cases this was minor and usually resolved spontaneously.

Vitreous haemorrhage (16%) and hyphema (10%) was the most common complication in Mazhri ZU and Qadri WM study. This was slightly higher compared to other studies. After modification of the technique by Basti et al, incidence was decreased from 20% to 13.3 %.⁵⁶

Hidemann and Dunn reported 11% incidence of vitreous haemorrhage and hyphema. Holland and colleagues in their 115 cases reported no vitreous hemorrhage.⁵⁶

A transscleral penetrating point located 2 mm posterior to surgical limbus carried a higher risk for bleeding because the major arterial circle of iris is

situated mainly in the ciliary body, which is approximately 2 mm from the surgical limbus.³⁷

Placing the suture anterior i.e. 0.5 -1 mm behind the surgical limbus and preventing 3 and 9 o' clock positions may reduce bleeding risk by avoiding the long posterior ciliary arteries and vascular ciliary body. Using the minimum number of sutures and inserting the needle perpendicular to the sclera in an externo technique also decreased the incidence of bleeding.³⁸

Endophthalmitis

Endophthalmitis is a dreaded complication, which can occur after any intraocular procedure.³⁸ The incidence of endophthalmitis following cataract surgery has been reported to be 0.08% to 0.26%.⁵⁸

Although pathogens can be introduced into the eye at the time of surgery, they can also gain entry through exposed sutures as in suture-fixated PCIOLs.^{38,60}

Increased surgical complexity and complications such as posterior capsule rupture and associated vitreous loss increase the risk of endophthalmitis.⁵⁹

Hatch et al. reported a nearly 10 fold increase in risk of endophthalmitis when an unplanned anterior vitrectomy is performed.⁵⁹

Endophthalmitis following sutured PCIOLs occurred primarily due to exposed suture ends, and can be prevented by leaving the suture ends long,

tying the knot in the depths of a partial thickness scleral incision or by rotating knots into the sclera.^{38, 53}

Glaucoma

Postoperative glaucoma incidence following TS PCIOL varies from 4.9 to 40%. Study by Nottage et al found the incidence of postoperative glaucoma was 4% which was slightly lower than the reported range.⁶⁰

In McAllister AS and Hirst LW study the incidence of post operative ocular hypertension was 30.5%. Among this 44% had a history of glaucoma.⁵³

Risk factors for post operative ocular hypertension include a previous history of glaucoma, trauma, treatment of retinal detachment with silicone oil, viscoelastic use, corticosteroid use and hyphaema⁵³

Mazhri ZU and Kadri WM study observed glaucoma to be the most common complication following secondary SFIOL, 8 eyes(16%) followed by vitreous haemorrhage in 4 eyes(8%) and hyphema in 2 eyes(4%). Clinically significant IOL tilt occurred in 1 case (2%).⁵²

Glaucoma was seen in 3 cases post operatively of which 2 cases required treatment.⁶¹

CME or Uveitis

The risk of uveitis or cystoids macular oedema associated with sclera fixated PCIOL is less than that seen in ACIOL or iris fixated IOLs. Incidence of CME after TSPCIOL ranges from 1.5% to 22.6%.⁶⁰

In Ma DJ et al study, which compared ciliary sulcus and pars plana locations for PCIOLs, CME was seen in 29% of ciliary sulcus PCIOL group and 6.8% in pars plana PCIOL group and the total incidence in both the groups were 5.1%.³⁷

Many factors contribute to the occurrence of CME after sclera fixation of PCIOLs. Most of the cases were associated with vitreous loss either at the initial event with loss of capsular support or during sclera fixation. Other contributing factor for development of CME is light induced retinal injury. This is due to the increased operating time in sclera fixation of PCIOL.³⁸

The main stay of treatment of CME is with topical NSAIDs and topical steroids. Topical ketorolac has also been shown to reduce angiographic CME in a randomised controlled study. For refractory cases, peribulbar injection of steroid, systemic steroids and oral acetazolamide have been used.³⁸

Retinal Detachment

Following TSPCIOL insertion, post operative retinal detachment occurs at an incidence of 3.1% to 9.5%. In Nottage JM et al study, post operative retinal detachment occurred in 2 cases (1.9%).⁶⁰

Retinal detachment is more common when anterior vitreous face is disturbed with or without vitreous prolapsed.³⁸

In young patients, there is a greater risk of retinal detachment with SF PCIOLs due to the ocular pathology and posterior hyaloids. The risk of retinal detachment from ectopia lentis and axial myopia ranges from 9% to 19%.⁵³

The risk of retinal detachment increases with too posterior placement of suture fixation.⁵⁶

In Ghaeseminejad AK study, incidence of retinal detachment is 3.2%.⁵⁷

Scleral PCIOL fixation often requires complete vitrectomy; otherwise vitreous strands can adhere to the IOL haptic leading to vitreoretinal traction and to retinal detachment.⁵⁷

Lyle and Jin reported that the rate of RD was higher in the PCIOL group than the ACIOL group. Posterior vitreous detachment and vitreous liquation occur within one year post operatively in most aphakic eyes. This explains decreased RD rate when secondary IOL is implantation is performed after one year.⁵⁴

AIM OF THE STUDY

The aim of the study is to analyse

1. The visual outcome in secondary posterior chamber intraocular lens implantation
2. The complications associated with secondary posterior chamber intraocular lens implantation

MATERIALS AND METHODS

This prospective clinical study was conducted in department of ophthalmology, Coimbatore medical college from September 2011 to September 2012.

MATERIALS

The study included 30 aphakia patients who presented to our outpatient department. These patients were treated with different secondary posterior chamber intraocular lens implantation depending on the presence or absence of capsular remnants. These patients were followed up for a period of 6 weeks postoperatively.

A standard case Proforma was maintained and detailed clinical history was taken. These included, name of the patient, age, sex, address, duration of aphakia, history of trauma, history of previous surgery and its details, history of systemic diseases like diabetes mellitus, systemic hypertension, cardiac disease, bronchial asthma, epilepsy was noted. Routine investigations like blood pressure measurement, random blood sugar and urine sugar testing was done. These patients were taken up for surgery after control of systemic diseases.

METHODS

Preoperative uncorrected and best corrected visual acuity was noted using Snellen's distance visual acuity chart.

Anterior segment examination done with slit lamp and findings noted. Presence of aphakia and status of capsular remnants was noted. Integrity of the

posterior capsule was noted. Integrity of the posterior capsule whether intact, partially present or total absence of capsular remnants was noted after full dilatation of the pupil. Based on the capsular status, type of secondary PCIOL implantation was decided. Presence of any vitreous strands in pupillary area, anterior chamber or vitreous incarceration in scleral wound was noted. Pupillary abnormalities, posterior synechiae and presence of peripheral iridectomy and its position noted.

INTRAOCULAR PRESSURE

Goldmann's applanation tonometer was used to measure IOP in all patients preoperatively.

FUNDUS EXAMINATION

Fundus was examined with direct ophthalmoscope and indirect ophthalmoscope using +20 D lens to assess the peripheral retina. Fundus was also examined with slit lamp using +90 D lens.

IOL POWER CALCULATION

Keratometry was done with Bausch and Lomb keratometer. K_1 and K_2 readings were taken. Axial length of the eye was done with the help of 'A' scan. IOL power was calculated with SRK II formula using 118.2 as A constant.

INCLUSION CRITERIA

1. Patients with unilateral aphakia
2. BCVA better than or equal to 6/60 by Snellen's visual acuity chart
3. Normal fundus as seen by direct and indirect ophthalmoscope

EXCLUSION CRITERIA

1. Patients with central corneal opacity, glaucoma, uveitis
2. Any fundus abnormality affecting visual function like macular degeneration, chorioretinal atrophy etc.,
3. BCVA worse than 6/60 by Snellen's visual acuity chart
4. Patients of bilateral aphakia
5. One eyed patients

PRE-OPERATIVE PREPARATION

After taking detailed medical history and thorough check up of blood pressure, blood sugar, cardiovascular system, respiratory system, gastro intestinal and central nervous assessment and eye lashes were cut.

MYDRIASIS

Preoperatively pupils were dilated using 0.5% tropicamide, 10% phenylephrine and flurbiprofen. These drops were instilled every 15 minutes one hour before surgery.

Preoperatively antibiotic eye drops were instilled one hour before surgery.

AKINESIA AND ANAESTHESIA

Akinesia and anaesthesia of the eye was achieved by peribulbar injection of 3 ml of 2% xylocaine with 5 IU/ml of hyaluronidase and 1:200000 adrenaline with 2ml of bupivacaine. This was given with 23G needle.

Peribulbar block was given at the junction of outer one third and inner two thirds of the lower orbital rim. The needle was directed away from the eye and towards the floor of the orbit with eye in primary gaze. In the superior orbital margin injection was given at the junction of medial one- third and lateral two third towards the roof of the orbit. When orbicularis oculi function remains active seventh cranial nerve akinesia was achieved by O'Brien akinesia technique with 2ml of 2% lidocaine with 1:200000 adrenaline with hyaluronidase. The condyloid process of the mandible was palpated just in front of tragus of ear by asking the patient to open and close his or her mouth. Anaesthetic mixture was injected over the center of condyloid process at a depth of 1cm with 23G needle.

LOWERING OF IOP:

The IOP was reduced by giving tab. Acetazolamide 250mg one hour before the surgery. Ocular hypotony was also achieved by ocular compression after peribulbar block using steady digital pressure on globe for 20 seconds periods separated by 10 seconds interval.

CLEANING OF SKIN AND CONJUNCTIVA:

Preparation included use of 5% povidone iodine to clean the surrounding skin. Skin area that extended from midline to beyond lateral canthus and from above the eyebrows to well down onto the cheek was cleaned. 5% iodine solution was applied into conjunctival cul de sac with subsequent saline wash to cleanse the conjunctiva.

DRAPING THE SURGICAL FIELD:

The eye and surrounding sterile periocular region was draped with a sterile cloth with a 3cm×3cm round opening for the eye.

SURGICAL TECHNIQUE:

Depending on the capsular remnants status technique of PCIOL was decided.

SECONDARY PCIOL IMPLANTATION:

- Step 1: Superior rectus bridle suture and conjunctival peritomy
 - Superior rectus bridle suture was applied and a conjunctival peritomy was done for 7mm at superior limbus.
- Step 2: Hemostasis
 - Bipolar wet field cautery was used for hemostasis
- Step 3: Scleral flap
 - Superior scleral flap of 6.5mm length was made of 2/3rd thickness 1mm posterior to the limbus.
- Step 4: AC entry
 - AC was entered with a 2.8mm diameter keratome. The keratome entry was extended up to the width of the external sclera flap of 6.5mm.
- Step 5: Automated 23G Anterior Vitrectomy
 - A thorough Automated 23 G Anterior vitrectomy was done. Any peripheral cortical remnants were cleared with the vitrectomy.

- Step 6: Viscoelastic injection
 - The viscoelastic was injected to inflate the capsular bag and for maintaining anterior chamber.
- Step 7: Synechiolysis
 - Any synechiae between the posterior iris and capsule was released using blunt spatula. Anterior and posterior capsule were separated.
- Step 8: IOL implantation
 - Rigid PMMA lens was implanted into the capsular bag and dialled for centration.
- Step 9: Removal of viscoelastic
 - Viscoelastic substance was removed using Simcoe's irrigation aspiration cannula.
- Step 10: Wound closure
 - Anterior chamber was reformed and wound closed.
- Step 11: Conjunctival approximation and subconjunctival injection
 - Conjunctival approximation was done and 1 ml of subconjunctival injection containing 0.5ml gentamicin and 0.5ml dexamethasone was given.

Pad and bandage was applied.

SECONDARY CILIARY SULCUS FIXATION OF IOL

The procedure from step 1 to 5 was same and included superior rectus bridle suture, conjunctival peritomy, hemostasis, scleral flap, AC entry and automated 23 G anterior vitrectomy.

- Step 6: viscoelastic injection
 - Viscoelastic was injected between posterior iris and capsule. It was also used to maintain the anterior chamber.
- Step 7: Synechiolysis
 - Any synechiae between the posterior surface of the iris and capsular remnants was released with blunt spatula or cut with Vanna's scissors.
- Step 8: IOL implantation
 - A rigid PMMA IOL was implanted in the ciliary sulcus between posterior surface of the iris and the capsule.
- Step 9 to 11: Removal of viscoelastic, wound closure conjunctival approximation and subconjunctival injection was given as described in above procedure.

SECONDARY SCLERAL FIXATED IOL IMPLANTATION

- Step 1 and 2: superior rectus bridle suture, conjunctival peritomy and hemostasis was achieved as described above.
- Step 3: Scleral flap

- Superior sclera flap of 6.5 mm length was made of 2/3rd thickness 1 mm from the limbus. Two 2mm 2/3rd thickness sclera flaps are made 2mm from the limbus at 2 o'clock and 8 o'clock respectively.
- Step 4: AC entry
 - AC was entered with a 2.8mm diameter keratome. The keratome entry was extended up to the width of the external sclera flap of 6.5mm.
- Step 5: Automated 23G Anterior Vitrectomy
 - A thorough Automated 23 G Anterior vitrectomy was done. Any peripheral cortical remnants were cleared with the vitrectomy.
- Step 6: suture passage
 - A 10-0 polypropylene suture end was threaded into the bore of 26G needle and passed into the scleral flap at 2 o'clock position. The needle is passed posterior to the iris into the posterior chamber. The suture is taken out through the main scleral wound by McPherson forceps. The same procedure was repeated at 8 o'clock position.
- Step 7: Suture tying to the haptics
 - The two suture ends were tied to the haptics of rigid PMMA lens. Care was taken to ensure that the 2 o'clock suture is matched with superior eyelet of the haptic and the inferior haptic eyelet likewise

related to 8 o'clock suture exiting the inferior aspect of the groove.

The knots were tied to the haptic in 3:2:1 pattern.

- Step 8: IOL insertion
 - IOL with sutures tied to the haptics was inserted into the anterior chamber and placed in the ciliary sulcus and centered. The suture was gently pulled and scleral flaps were sutured and the knot buried in the scleral bed in the groove.
- Step 9: Wound closure
 - The main superior scleral flap was sutured with 10-0 nylon suture and anterior chamber reformed with air.
- Step 10: Conjunctival approximation and subconjunctival injection
 - Conjunctival approximation was done and 1 ml of subconjunctival injection containing 0.5ml gentamicin and 0.5ml dexamethasone is given.

Pad and bandage was applied.

POSTOPERATIVE MANAGEMENT

Postoperatively patients were treated with topical antibiotic-steroid drops for a period of 6 weeks which was gradually tapered.

Patients were followed up for a period of 6 weeks.

Postoperative day 1:

Patient was examined for

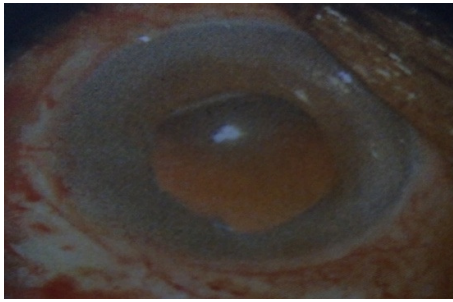
1. Wound approximation

2. Corneal status
3. Anterior chamber depth and reaction
4. IOL centration
5. BCVA with Snellen's distance visual acuity chart
6. IOP by applanation tonometry.

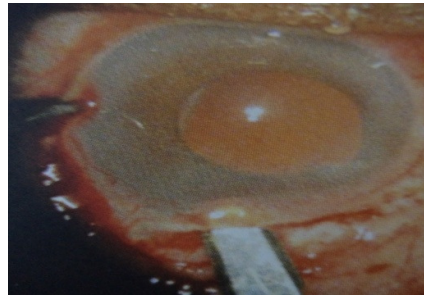
Postoperative 1 week/ 6 week

Patient was examined for

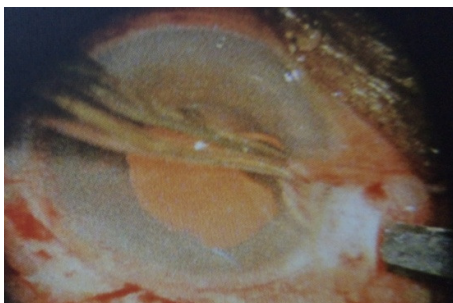
1. BCVA with Snellen's distance visual acuity chart
2. Corneal status
3. Anterior chamber depth and reaction
4. IOL centration
5. IOP by applanation tonometer
6. Fundus evaluation by direct ophthalmoscope, indirect ophthalmoscope and with +90 D lens using slit lamp.



APHAKIA



SUPERIOR SCLERAL TUNNEL



SCLERAL TUNNEL AT 8 O'CLOCK



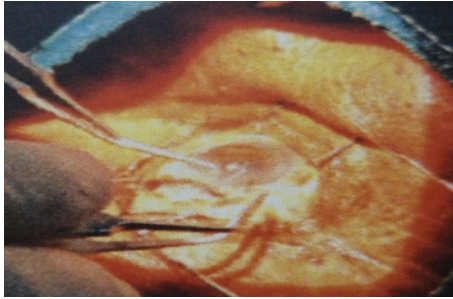
**PASSAGE OF SUTURE INTO THE
BORE OF 26 G NEEDLE**



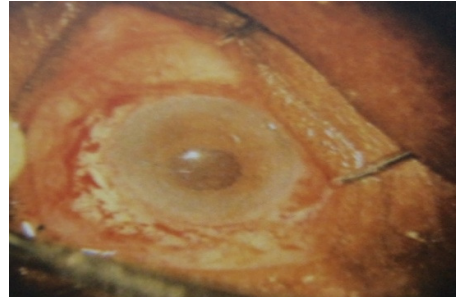
**PASSAGE OF NEEDLE INTO
POSTERIOR CHAMBER**



SUTURE RETRIEVAL



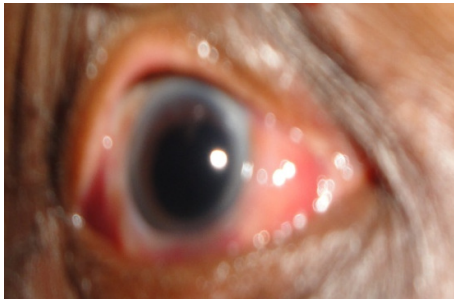
**TYING SUTURE TO BOTH
HAPTICS**



IOL INSERTION



IOL INSERTED AND CENTERED



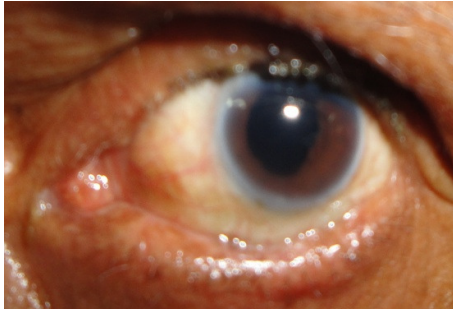
APHAKIA



**SECONDARY SFIOL
ON 1ST POSTOPERATIVE DAY**



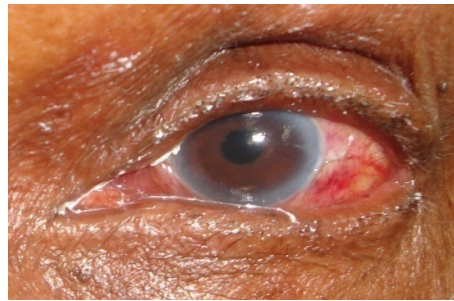
**SECONDARY SFIOL
6 WEEKS POSTOPERATIVELY**



APHAKIA



**SECONDARY CILIARY SULCUS
FIXATION IOL ON 1ST POSTOP DAY**



**SECONDARY CILIARY SULCUS
FIXATION IOL ON 1 WEEK POSTOP**

RESULTS AND OBSERVATION

A total of 30 aphakia patients were subjected to secondary intraocular lens implantation.

Table 1: Age distribution

In our study 50% of the patients belonged to the age group of 61-70 years. 3.3% of the patients were in the age group of 41-50 years and no patients were above 80 years.

AGE GROUP	No. OF CASES	PERCENTAGE
41-50	1	3.3
51-60	12	40
61-70	15	50
71-80	2	6.7
81-90	0	0

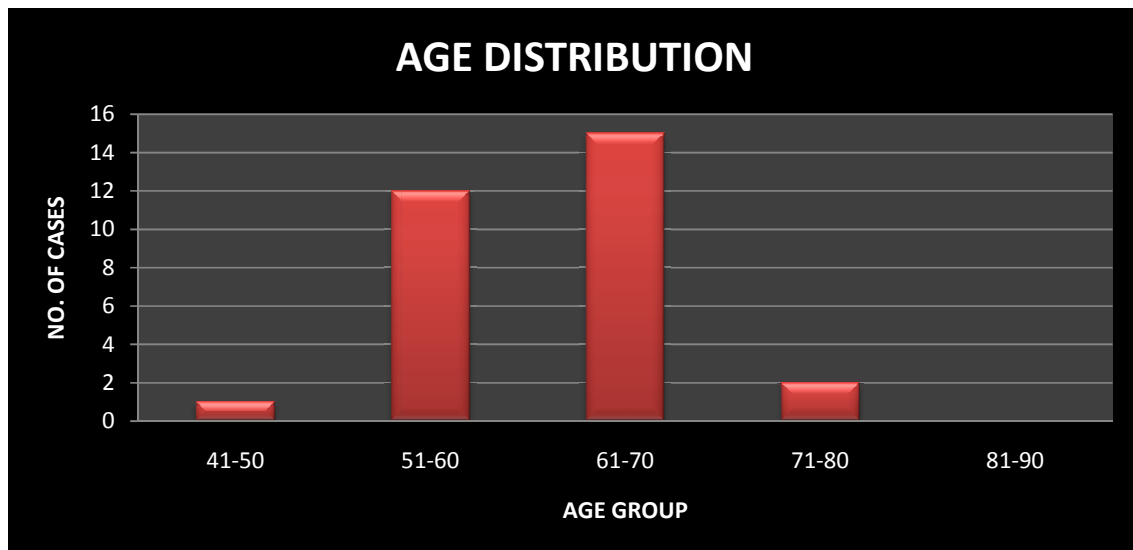
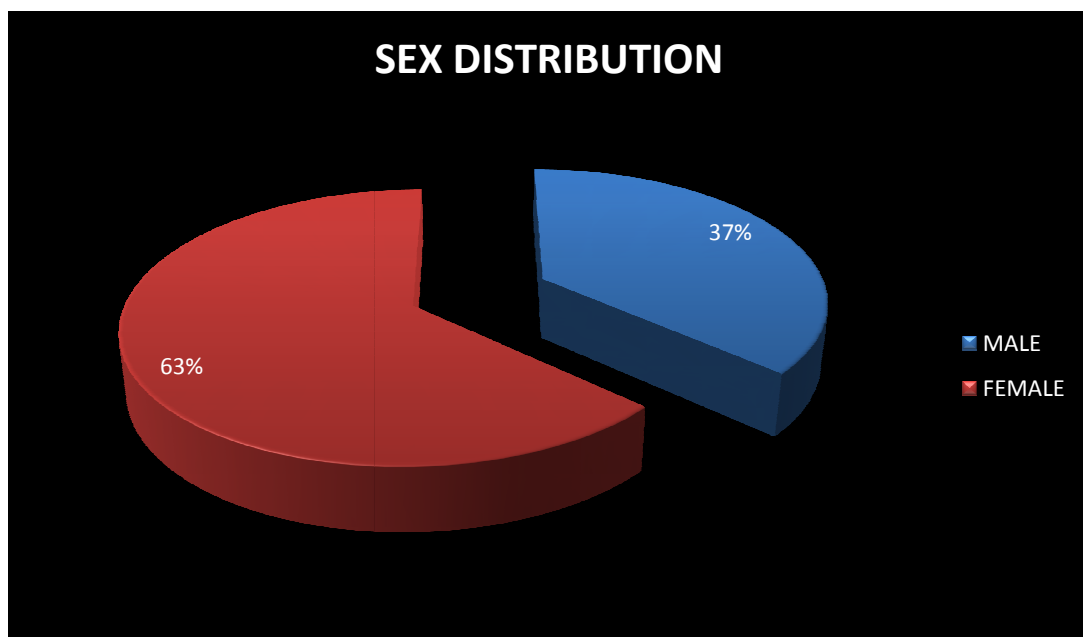


TABLE 2: SEX DISTRIBUTION

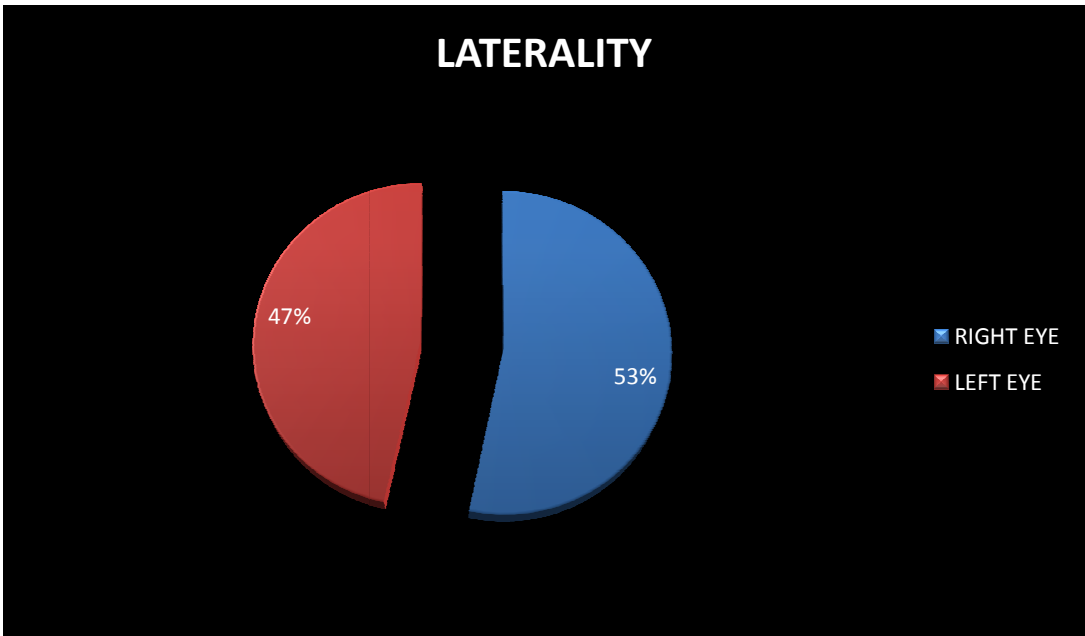
GENDER	NO. OF CASES	PERCENTAGE
MALE	11	36.7
FEMALE	19	63.3



In our study, majority of the patients were females accounting for 63% and males were 37%.

TABLE 3: LATERALITY

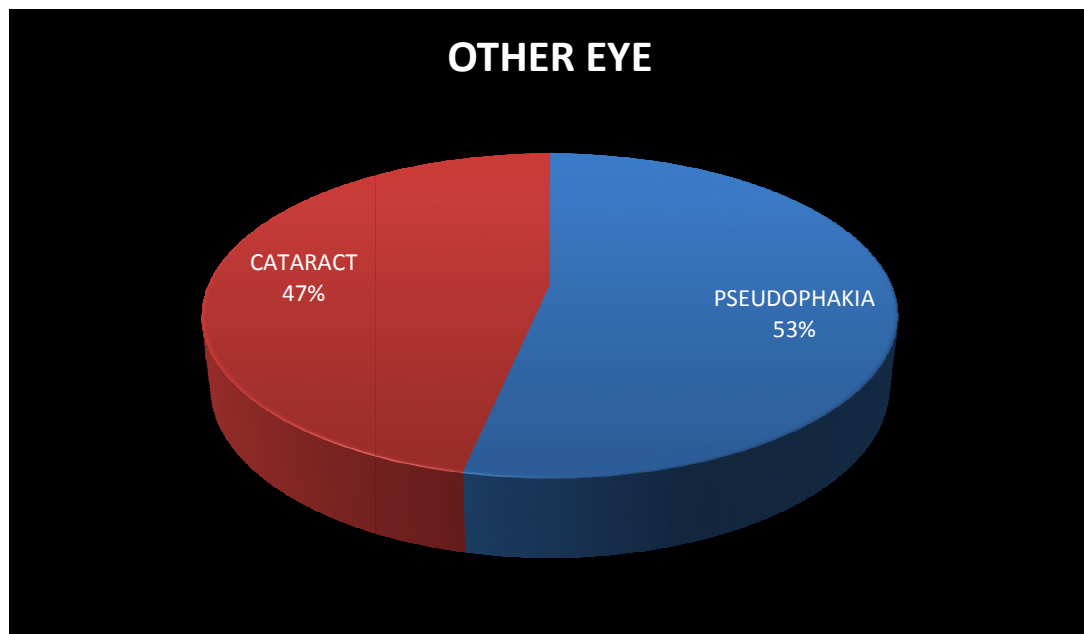
LATERALITY	NO. OF CASES	PERCENTAGE
RIGHT EYE	16	53.3
LEFT EYE	14	46.7



53% cases presented with right eye aphakia and 47% cases with left eye aphakia.

TABLE 4: STATUS OF THE OTHER EYE

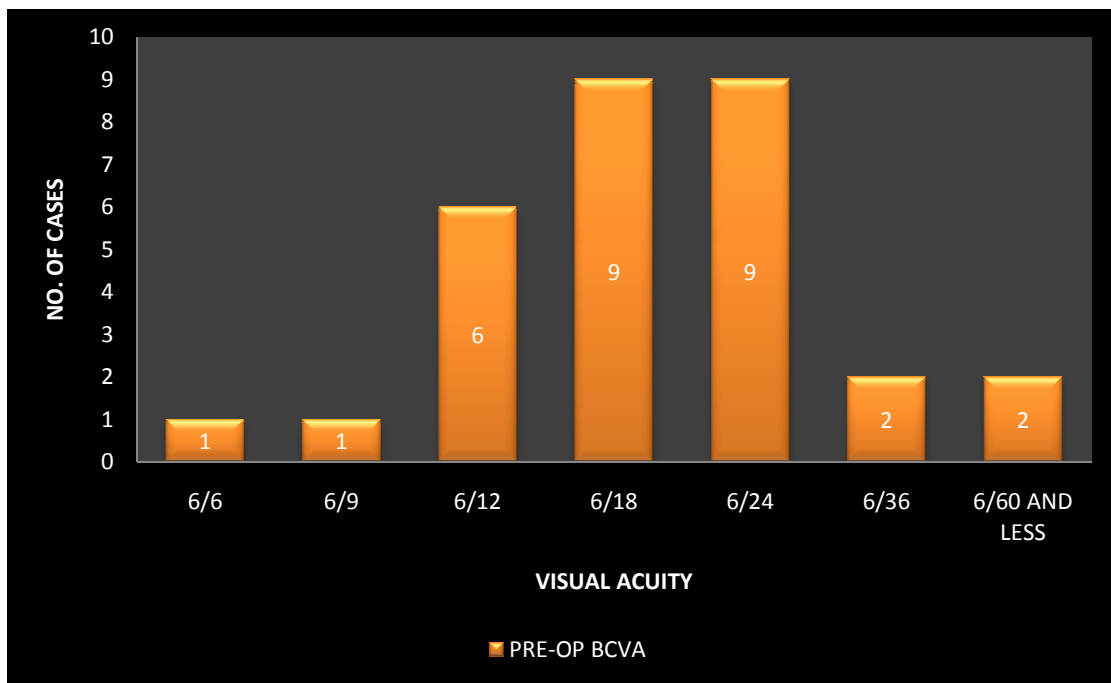
OTHER EYE	NO. OF CASES	PERCENTAGE
CATARACT	14	46.7
PSEUDOPHAKIA	16	53.3



In 53% cases, other eye had pseudophakia and in 47% cataractous lens.

TABLE 5: PRE-OPERATIVE BCVA

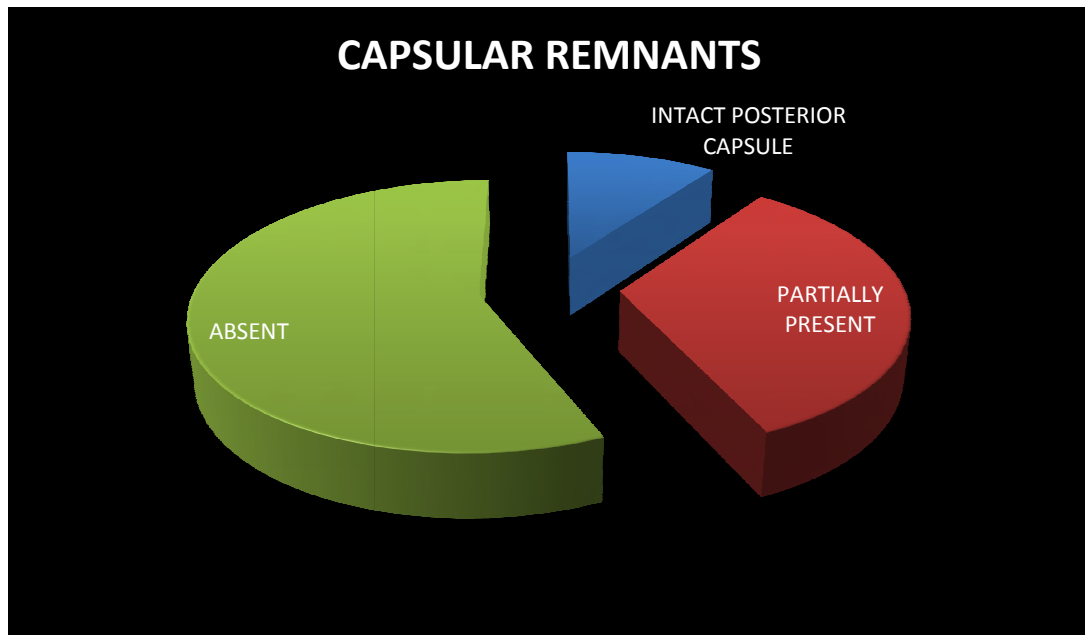
VISUAL ACUITY	NO. OF CASES	PERCENTAGE
6/6	1	3.3
6/9	1	3.3
6/12	6	20
6/18	9	30
6/24	9	30
6/36	2	6.6
6/60 and less	2	6.6



In our study, 17 cases (56.6%) had of BCVA 6/18 and above. 30% patients had 6/24 BCVA. 4 cases (13.3%) had BCVA of 6/36 and less.

TABLE 6: STATUS OF POSTERIOR CAPSULE

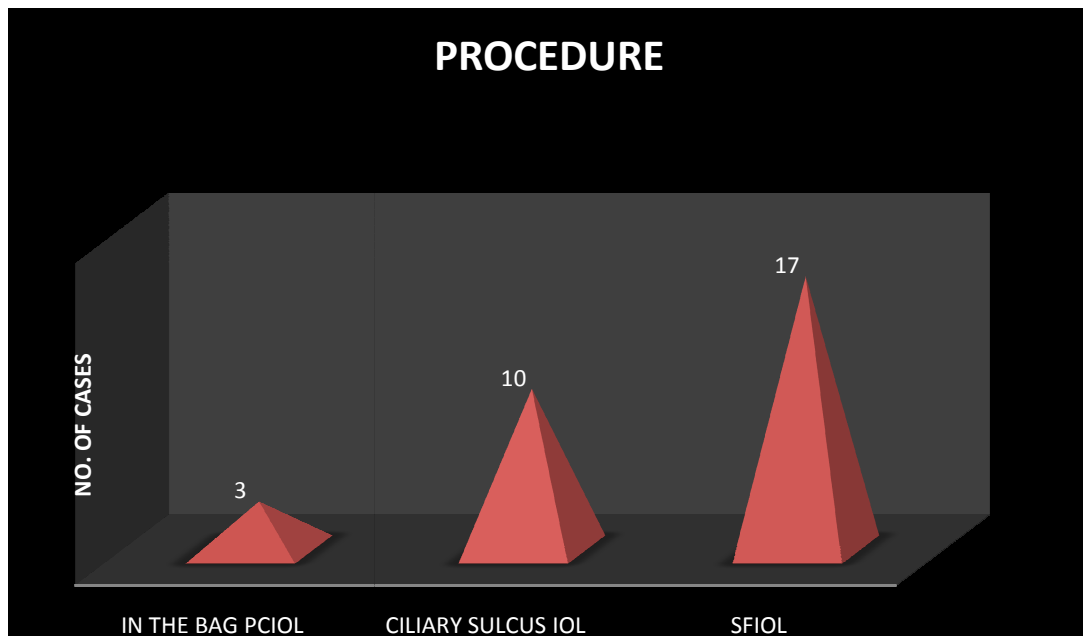
CAPSULAR REMNANTS	NO. OF CASES	PERCENTAGE
INTACT POSTERIOR CAPSULE	3	10
PARTIALLY PRESENT	10	33.3
ABSENT	17	56.6



17 cases (56.3%) in our study did not have capsular remnants suggestive either previous surgery of ICCE or large posterior capsular rupture. 10 cases (33.3%) had partial capsular remnants and 3 cases (10%) were seen with intact posterior capsule.

TABLE 7: PROCEDURE

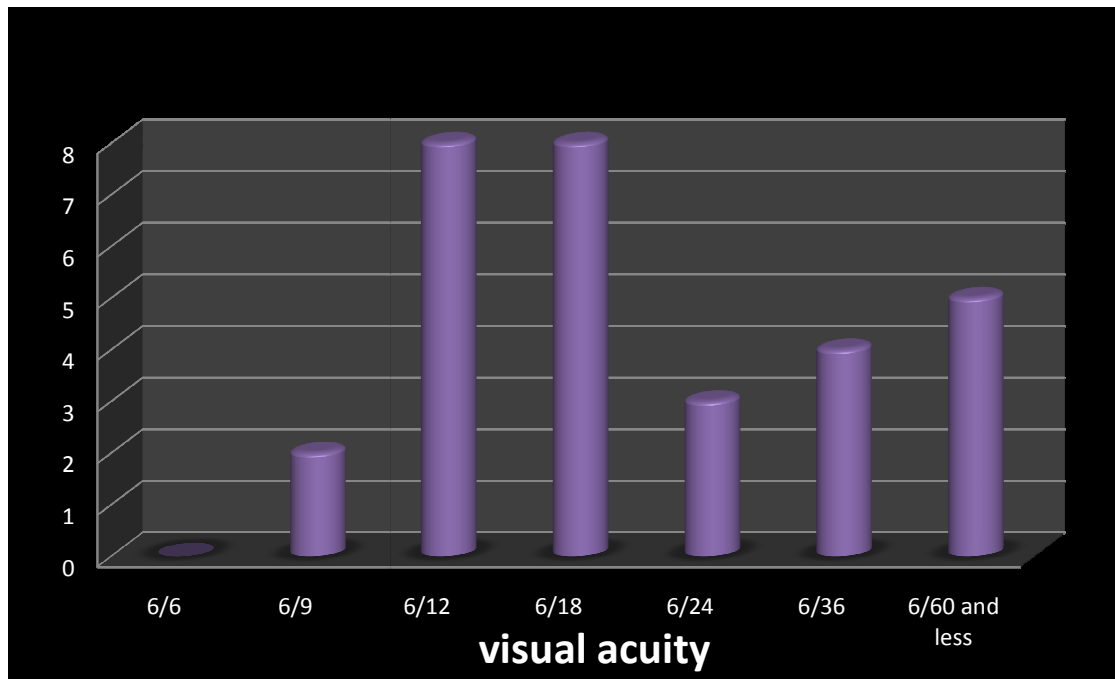
PROCEDURE	NO. OF CASES	PERCENTAGE
IN THE BAG PCIOL	3	10
CILIARY SULCUS IOL	10	33.3
SFIOL	17	56.6



17 cases (56.6%) underwent SFIOL who had total absence of capsular remnants. 10 cases (33.3%) had partial capsular remnants and underwent ciliary sulcus fixation IOL. 3 cases (10%) had intact posterior capsule and in the bag PCIOL was done.

TABLE 8: POSTOPERATIVE BCVA ON DAY 1

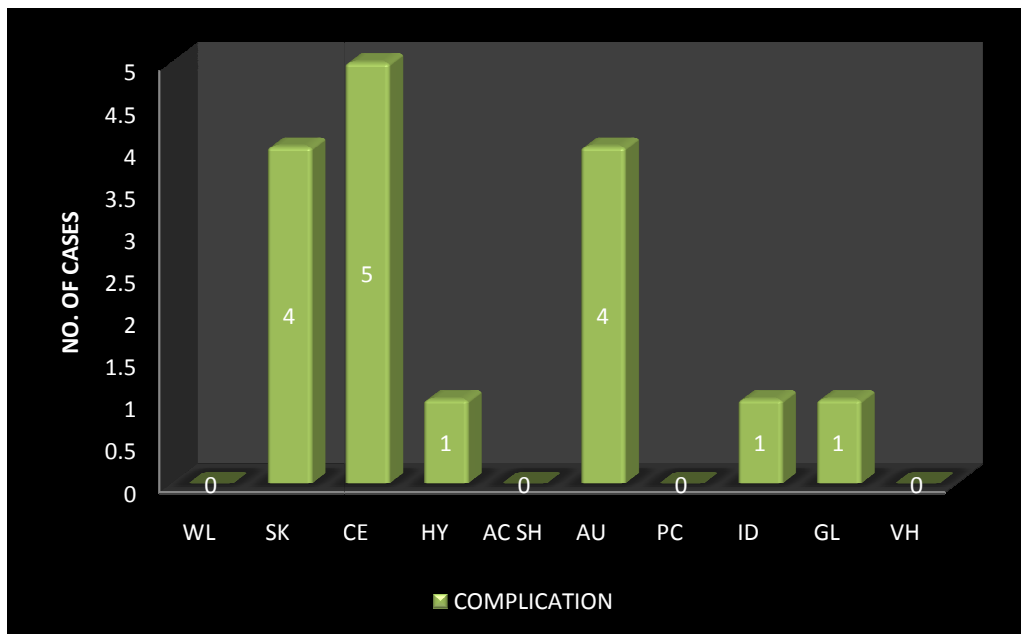
BCVA	NO. OF CASES	PERCENTAGE
6/6	0	0
6/9	2	6.7
6/12	8	26.7
6/18	8	26.7
6/24	3	10
6/36	4	13.3
6/60 and less	5	16.6



In our study, on the 1st postoperative day 18 cases (60%) had BCVA of 6/18 and above. 3 cases (10%) had BCVA of 6/24. 9 cases (30%) had BCVA of 6/36 and above.

TABLE 9: COMPLICATION PROFILE ON 1ST POSTOPERATIVE DAY

COMPLICATION	NO. OF CASES	PERCENTAGE
WOUND LEAK	0	0
SK	4	13
CORNEAL OEDEMA	5	17
HYPHEMA	1	3
AC SHALLOW	0	0
ANTERIOR UVEITIS	4	13
PUPILLARY CAPTURE	0	0
IOL DECENTRATION	1	3
INCREASED IOP	1	3
VITREOUS HEMORRHAGE	0	0

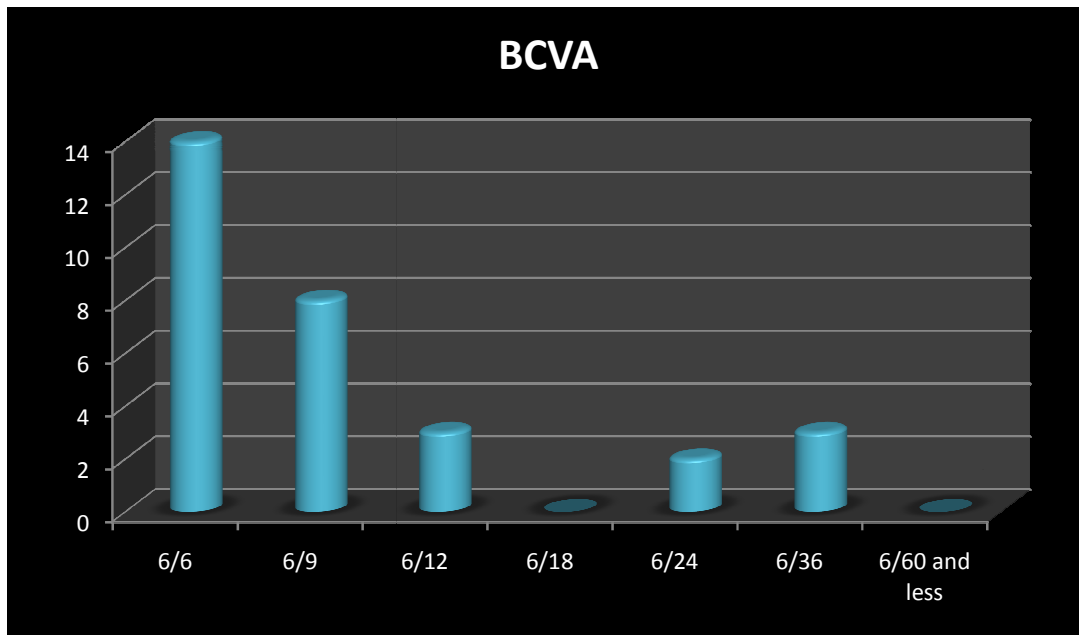


On the 1st operative day, strait keratopathy was seen in 4 cases (13.3%), corneal oedema in 5 cases (16.6%) and anterior uveitis was seen in 4 cases (13.3%).

1 case (3.3%) developed hyphema and same patient had increased IOP. IOL decentration was seen in 1 case (3.3%).

TABLE 10: BCVA 1 WEEK POSTOPERATIVELY

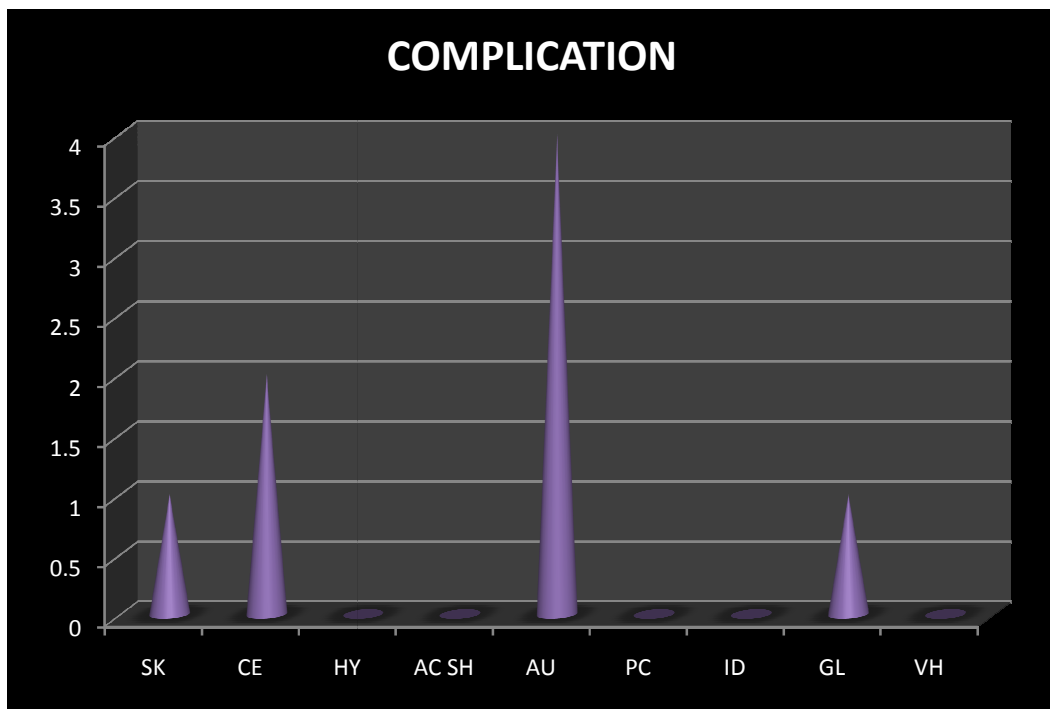
BCVA	NO. OF CASES	PERCENTAGE
6/6	14	46.6
6/9	8	26.6
6/12	3	10
6/18	0	0
6/24	2	6.6
6/36	3	10
6/60 and less	0	0



After 1 week postoperatively, 25 cases (83.3%) had BCVA of 6/18 and above. 2 cases (6.6%) had BCVA of 6/24. 3 cases (10%) had 6/36 of BCVA.

TABLE11: COMPLICATION PROFILE 1 WEEK POSTOPERATIVELY

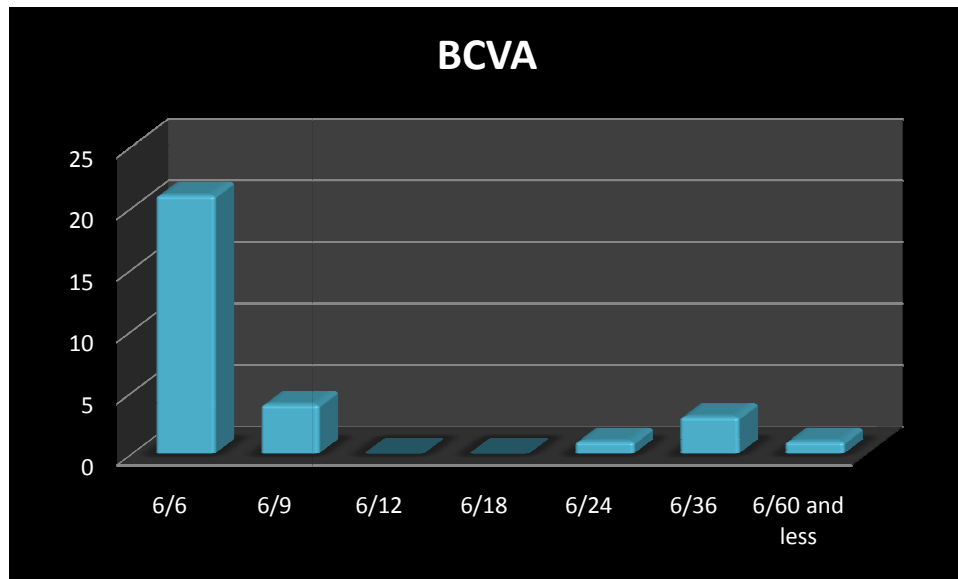
COMPLICATION	NO. OF CASES	PERCENTAGE
SK	1	3.3
CORNEAL EDEMA	2	6.6
HYPHAEMA	0	0
AC SHALLOW	0	0
ANTERIOR UVEITIS	4	13.3
PUPILLARY CAPTURE	0	0
IOL DECENTRATION	0	0
INCREASED IOP	1	3.3
VITREOUS HEMORRHAGE	0	0



After 1 week postoperatively, 4 cases (13.3%) had anterior uveitis even with treatment. Corneal oedema was seen in 2 cases (6.6%) and striate keratopathy in 1 case (3.3%). Increased IOP was seen in 1 case (3.3%).

Table 12: BCVA 6 WEEK POSTOPERATIVELY

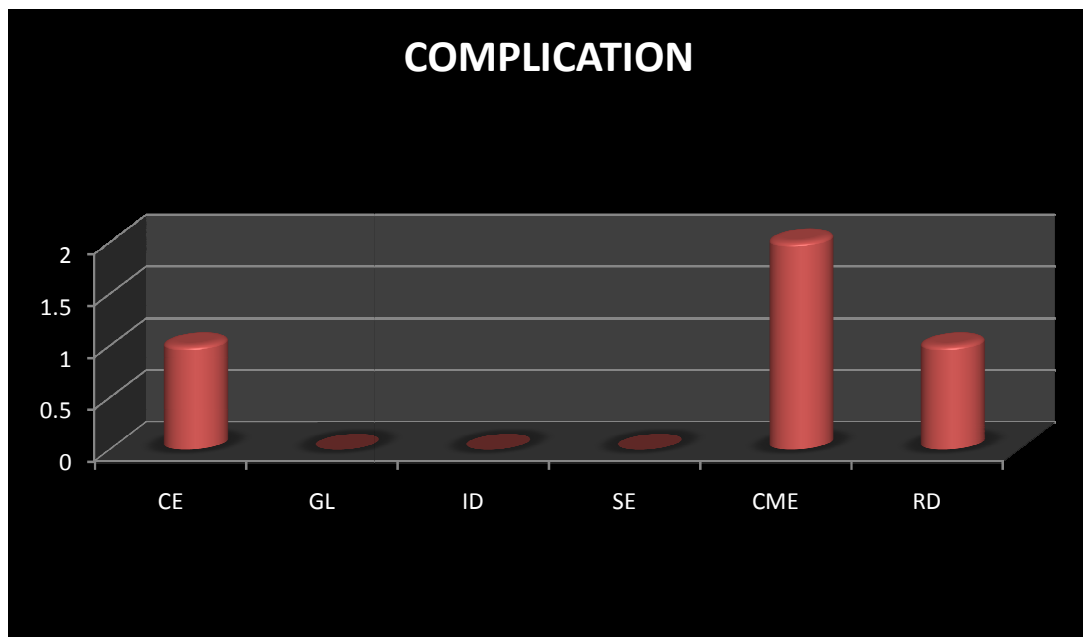
VISUAL ACUITY	NO. OF CASES	PERCENTAGE
6/6	21	70
6/9	4	13.3
6/12	0	0
6/18	0	0
6/24	1	3.3
6/36	3	10
6/60 and less	1	3.3



After 6 weeks postoperatively, 25 cases (83.3%) achieved BCVA of 6/9 and above. 1 case (3.3%) had BCVA of 6/24, 3 cases (10%) had BCVA of 6/36 and only 1 patient had BCVA of less than 6/60 which was attributed to the development of retinal detachment.

TABLE13: COMPLICATION PROFILE 6 WEEK POSTOPERATIVELY

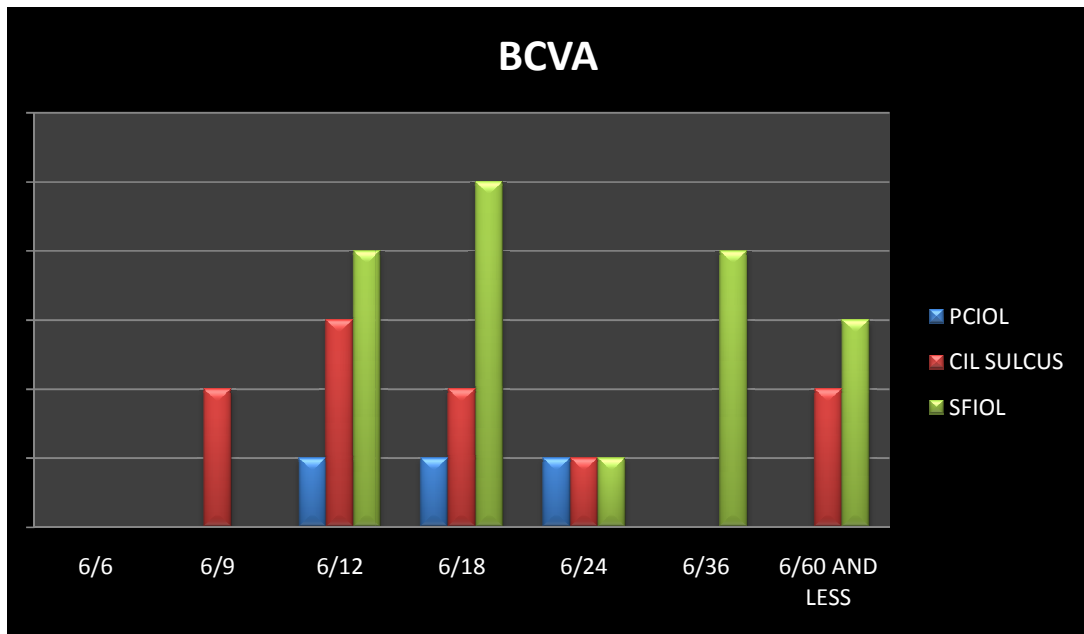
COMPLICATION	NO. OF CASES	PERCENTAGE
CORNEAL EDEMA	1	3
INCREASED IOP	0	0
IOL DECENTRATION	0	0
SUTURE EROSION	0	0
CYSTOID MACULAR EDEMA	2	7
RETINAL DETACHMENT	1	3



2 patients had cystoid macular oedema contributing to the defective vision in these patients who were treated appropriately. 1 patient developed retinal detachment at 6 weeks postoperatively and was treated for the same.

TABLE 14: BCVA ON DAY 1 POSTOPERATIVELY

BCVA	IN THE BAG PCIOL	CILIARY SULCUS IOL	SFIOL
6/6	0	0	0
6/9	0	2	0
6/12	1	3	4
6/18	1	2	5
6/24	1	1	1
6/36	0	0	4
6/60 and less	0	2	3



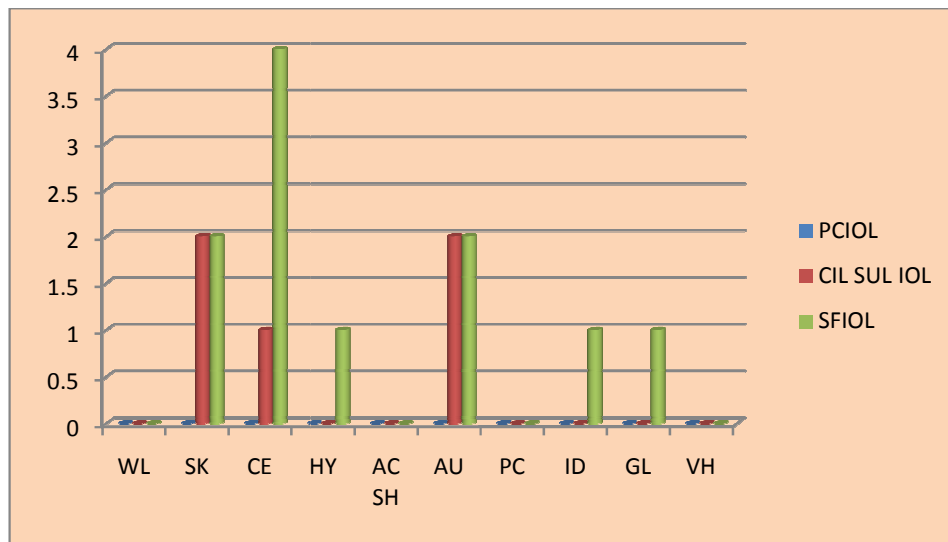
2 cases (66.6%) had BCVA of 6/18 and above in patients with in the bag PCIOL and 1 case (33.3%) had BCVA of 6/24.

In ciliary sulcus fixation IOL, 7 cases (70%) had BCVA of 6/18 and above. 1 case (10%) had BCVA of 6/14 and 2 cases (20%) had BCVA of 6/36.

In SFIOL group, 9 cases (52.9%) achieved BCVA of 6/18 and above. 1 case (5.8%) had BCVA of 6/24 and 7 cases (41.1%) had BCVA of 6/36 and less on 1st postoperative day.

TABLE 15: COMPLICATION PROFILE ON 1ST POSTOPERATIVE DAY

COMPLICATION	PCIOL	CIL SULCUS IOL	SFIOL
WOUND LEAK	0	0	0
SK	0	2	2
CORNEAL EDEMA	0	1	4
HYPHAEMA	0	0	1
AC SHALLOW	0	0	0
ANTERIOR UVEITIS	0	2	2
PUPILLARY CAPTURE	0	0	0
IOL DECENTRATION	0	0	1
INCREASED IOP	0	0	1
VITREOUS HEMORRHAGE	0	0	0



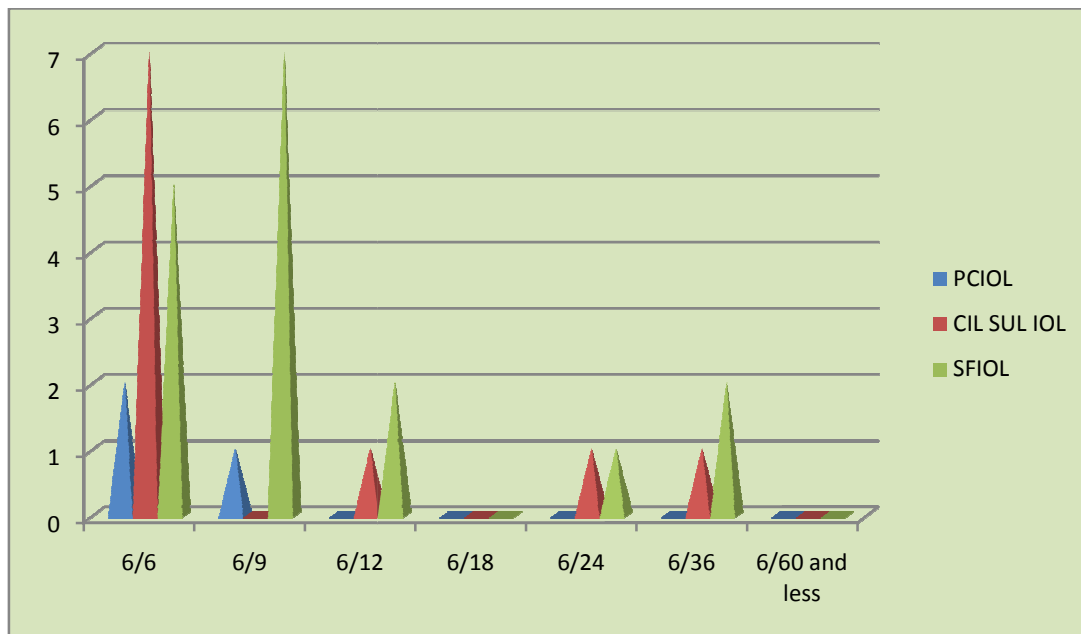
There were no complications seen in PCIOL group on 1st postoperative day.

In patients with ciliary sulcus fixated IOL, 2 cases (20%) had SK and 2 cases (20%) had anterior uveitis and 1 case (10%) had corneal oedema.

In SFIOL group, 1 patient (5.8%) developed hyphema and increased IOP. 4 cases (23.5%) had corneal oedema on 1st postoperative day and 2 cases (11.8%) had anterior uveitis. IOL decentration was seen in 1 case (5.8%).

TABLE 16: BCVA 1 WEEK POSTOPERATIVELY

BCVA	IN THE BAG PCIOL	CILIARY SULCUS IOL	SFIOL
6/6	2	7	5
6/9	1	0	7
6/12	0	1	2
6/18	0	0	0
6/24	0	1	1
6/36	0	1	2
6/60 and less	0	2	0



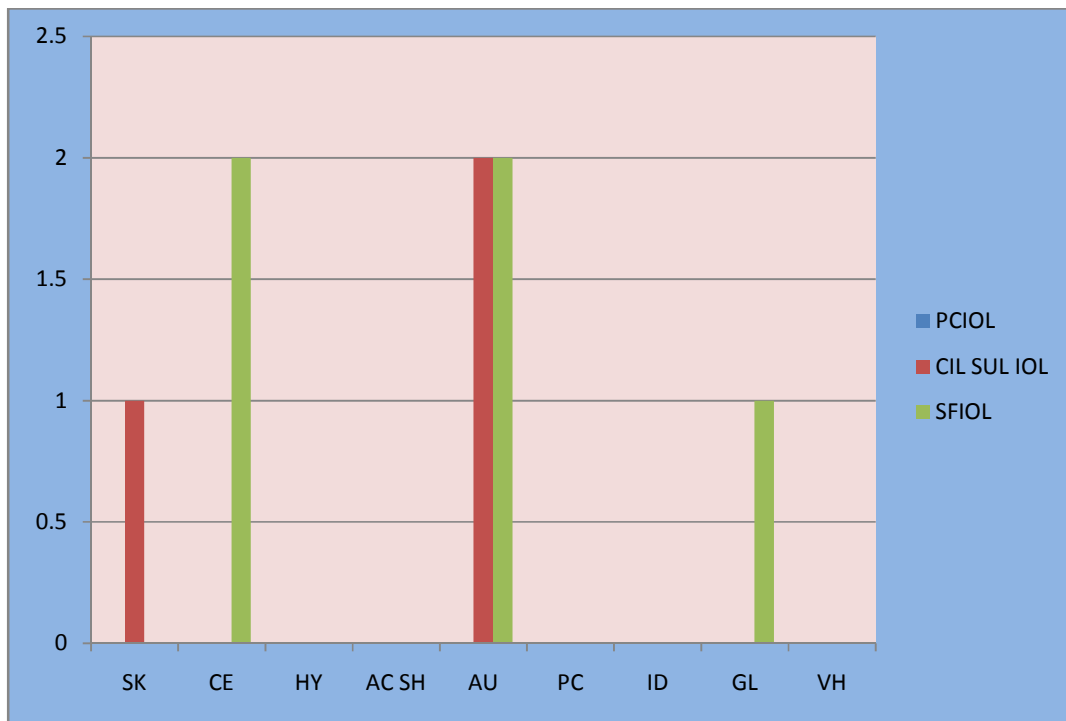
In the PCIOL group, 2 cases (66.6%) achieved BCVA of 6/6 within 1 week postoperatively and 1 case (33.3%) had BCVA of 6/9.

In ciliary sulcus IOL implantation group, 8 cases (80%) achieved BCVA of 6/12 and above. 1 case (10%) had BCVA of 6/24 and 1 case (10%) had 6/36 of BCVA.

In SFIOL group, 14 cases (82.3%) achieved BCVA of 6/12 and above. 1 case (5.8%) had BCVA of 6/24. 2 cases (11.7%) achieved BCVA of 6/36.

TABLE17: COMPLICATION PROFILE 1 WEEK POSTOPERATIVELY

COMPLICATION	IN THE BAG PCIOL	CILIARY SULCUS IOL	SFIOL
SK	0	1	0
CORNEAL EDEMA	0	0	2
HYPHAEMA	0	0	0
AC SHALLOW	0	0	0
ANTERIOR UVEITIS	0	2	2
PUPILLARY CAPTURE	0	0	0
IOL DECENTRATION	0	0	0
INCREASED IOP	0	0	1
VITREOUS HEMORRHAGE	0	0	0



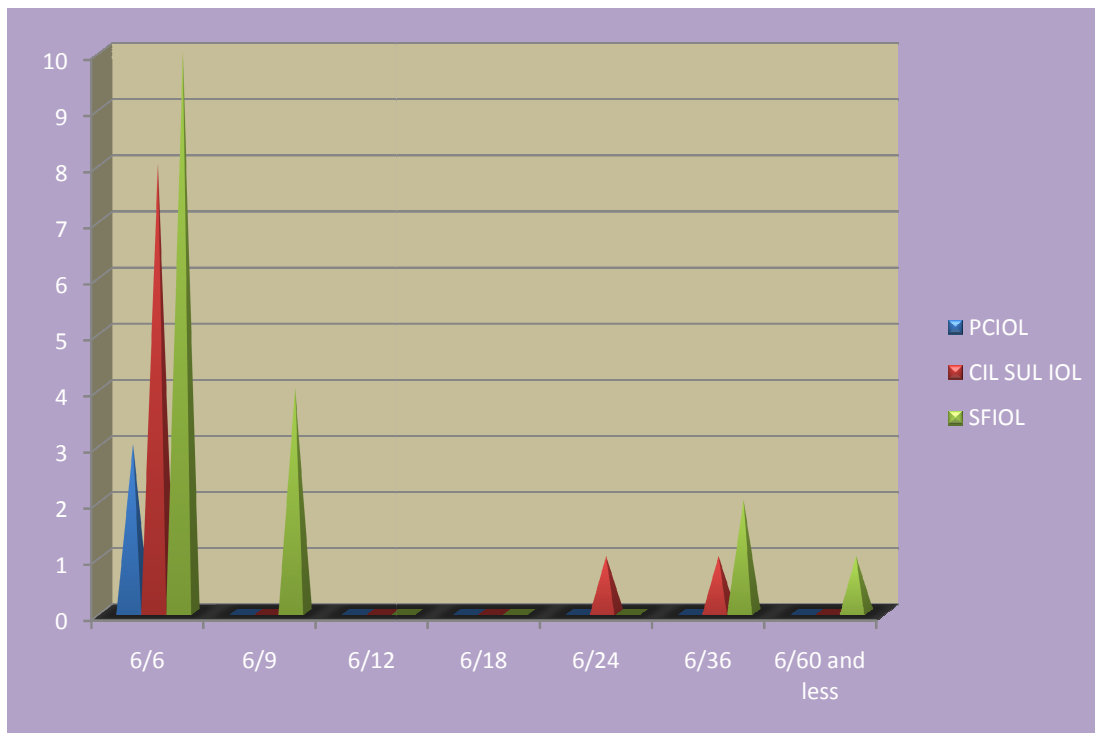
No complications were seen in the PCIOL group.

In ciliary sulcus IOL implantation group, 2(20%) patients had anterior uveitis and 1(10%) patient had SK.

In SFIOL group, 1(5.8%) patient had increased IOP, 2(12%) patients had corneal oedema and 2 cases (11.7%) of cases had persistent anterior uveitis in spite of treatment.

TABLE 18: BCVA 6 WEEKS POSTOPERATIVELY

BCVA	IN THE BAG PCIOL	CILIARY SULCUS IOL	SFIOL
6/6	3	8	10
6/9	0	0	4
6/12	0	0	0
6/18	0	0	0
6/24	0	1	0
6/36	0	1	2
6/60 and less	0	0	1



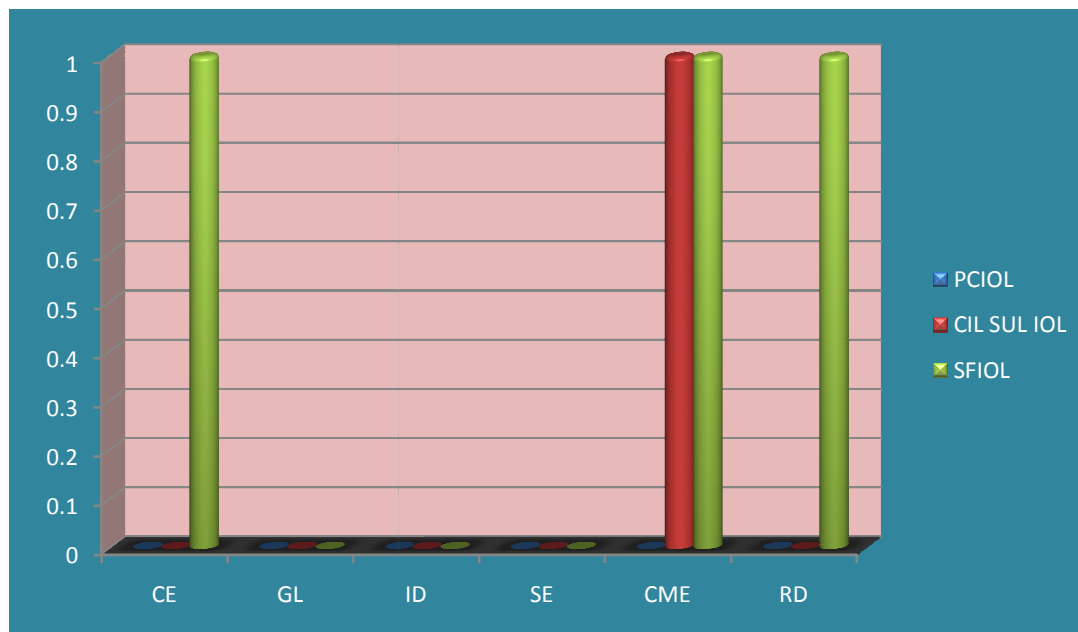
In PCIOL group, all the patients (100%) achieved BCVA of 6/6 by 6 weeks postoperatively.

In ciliary sulcus IOL group, 8 cases (80%) achieved BCVA of 6/6, 1 (10%) patient had 6/24. 1 case (10%) achieved BCVA of 6/36 and the cause for defective vision was due to the complication.

In SFIOL group, 14 cases (82.3%) achieved BCVA of 6/9 and above. 2 cases (11.7%) had BCVA of 6/36. 1 patient (5.8%) had BCVA of less than 6/60 which was attributed to the associated complication.

TABLE 19: COMPLICATION PROFILE 6 WEEKS POSTOPERATIVELY

COMPLICATION	IN THE BAG PCIOL	CILIARY SULCUS IOL	SFIOL
CORNEAL EDEMA	0	0	1
INCREASED IOP	0	0	0
IOL DECENTRATION	0	0	0
SUTURE EROSION	0	0	0
CYSTOID MACULAR EDEMA	0	1	1
RETINAL DETACHMENT	0	0	1



No complications were seen in patients with in the bag PCIOL group.

In ciliary sulcus fixation IOL group, 1 case (10%) developed cystoid macular oedema.

In SFIOL group, 1 patient (5.8%) had corneal oedema, 1 patient (5.8%) developed CME and 1 patient (5.8%) developed retinal detachment.

DISCUSSION

A large number of aphakic patients opt for secondary IOL implantation because of intolerance to contact lens and/or spectacle correction.

Various designs and fixation sites have been introduced for the correction of aphakia. But the posterior chamber IOL has become clearly the treatment of choice these days.

In our study, 30 cases presented to our outpatient department with monocular aphakia and were treated surgically with secondary posterior chamber IOL implantation. 17 cases underwent scleral fixation IOL who had totally deficient posterior capsule. 10 cases had partial presence of posterior capsule and were implanted IOL in the ciliary sulcus. 3 cases had intact posterior capsule and were implanted within the bag posterior chamber IOL.

The mean follow up of these patients was 6 weeks. 25 cases (83%) had a BCVA of 6/9 and above after 6 weeks post operatively. 4 cases (13%) had a BCVA of 6/36 or less. 1 cases (3%) had persistent corneal oedema even with treatment.

2 cases (7%) developed cystoid macular oedema of which 1 case had underwent ciliary sulcus fixation IOL and another patient was treated with SFIOL. Both the cases were treated for CME and BCVA was 6/36.

1 case (3%) had developed RD 1 month postoperatively and underwent RD surgery. This patient had undergone SFIOL and the BCVA after 6 weeks postoperatively was 2/60.

No complications were noted in cases that underwent secondary PCIOL implantation.

IOL decentration was noted in 1 case of SFIOL group on 1st postoperative day and was taken up for surgery for repositioning of IOL on the next day.

Hyphema was observed in 1 case who had undergone SFIOL implantation. It resolved spontaneously within 1 week. The same case had increase IOP for 1 week and was controlled with anti glaucoma drugs.

SK was observed in 4 cases (18%) which resolved with time and did not affect visual acuity.

Anterior uveitis was seen in 4 cases (13%), 2 cases with ciliary sulcus fixation and 2 cases with SFIOL implantation. These cases were treated with steroids and cycloplegics. Among 4 cases, 2 of them developed CME 6 weeks postoperatively affecting visual acuity.

COMPARISON WITH PREVIOUS STUDIES

1. Mazhry and Kadri did a prospective study of 45 patients over a period of 5 years from October 1995 to November 2000. The study was to evaluate secondary PCIOL implantation. In this study, intact PCIOL was implanted in 6 eyes, 11 eyes were treated with capsulotomy and implantation of IOL, 3 eyes underwent synechiolysis and IOL implantation, transscleral IOL fixation in 26 eyes, IOL retrieval and fixation of dislocated IOL in 4 eyes. Average visual acuity was in the range of 6/9-6/12. The most common complication was glaucoma (8

cases) followed by vitreous haemorrhage (4 cases with transscleral fixation) and hyphema (2 cases).

In our study, 83% had BCVA of 6/9 and above. Hyphema and glaucoma was seen in 1 case which was treated. No vitreous haemorrhage was observed in our study.

2. Siva Charan did a retrospective study of 100 of non sutured secondary PCIOL implantation. In his study, 85% of patients developed good visual acuity in immediate postoperative period (up to 6/24). 15% patients had visual acuity less than 6/24. Most common immediate postoperative complication was anterior chamber reaction (19 cases). 8 cases developed corneal oedema. 5 cases had SK, 1 case developed choroidal detachment, 2 cases had hyphema, vitreous haemorrhage was seen in 2 cases and fibrous membrane was seen in 9 cases.

In our study, in non sutured PCIOL group most common complication in postoperative period was anterior chamber reaction (15%) and SK (15%).

No hyphema or vitreous haemorrhage noted in our study. 1 case developed CME, who had BCVA of 6/36.

3. Ghaeseminejad AK and Ahmadi H reported the outcomes of transscleral fixation of PCIOL in 18 patients by a retrospective study. Postoperatively 9 cases (50%) had BCVA of $\geq 20/40$ and 9 cases (50%) had a BCVA of $\leq 20/40$. Early postoperative complications like uveitis

were seen in 3 cases (16.7%) which improved with steroid treatment.

Vitreous haemorrhage was seen in 2 cases (11.1%) which resolved spontaneously. Redislocation of IOL was seen in 2 cases (11.1%).

Retinal detachment developed in 1 patient (5.6%). 1 case (5.6%) had significant IOL tilting.

In our study anterior uveitis was seen in 4 cases (13%) which improved with treatment. Retinal detachment developed in 1 patient (3.3%) and was treated surgically. No vitreous haemorrhage and redislocation of IOL was noted.

4. Singh PG & Tripathy SK retrospectively studied 21 patients who underwent scleral fixation of IOL. 77% of patients achieved BCVA of 6/18 and above postoperatively. 1 case (4.5%) had intra operative vitreous haemorrhage. Early post operative complications like transient corneal oedema were seen in 13 cases (59%). IOL decentration in 3(13.6%).1 case (4.5%) was seen to have hyphema and fibrinous reaction is seen in 2 cases (9%). Corneal oedema in 2 eyes (9%) and optic capture in 1 eye (4.5%).

In our study late postoperative complications was seen in 1 patient (3.3%) with corneal oedema. No suture exposure was seen in 6 weeks post operatively and no pupillary capture.

SUMMARY

A prospective clinical study was conducted in Coimbatore medical college hospital which included 30 monocular aphakia patients who presented to our outpatient department. These patients were treated surgically with secondary intraocular lens implantation in the posterior chamber. Depending on the capsular status, 17 cases were treated with scleral fixation of intraocular lens who had no capsular remnants. 10 cases underwent ciliary sulcus fixation of intraocular lens who had partial capsular remnants and 3 cases had intact posterior capsule and underwent in the bag PCIOL implantation.

These patients were followed up for a period of 6 weeks post operatively and BCVA with Snellen's distance visual acuity chart was noted. Complications were also noted in the postoperative period.

The results concluded that secondary intraocular lens implantation in the posterior chamber was a safe and effective procedure with a success rate of 86.6%. Post operatively minor complications like striate keratopathy was seen in 4 cases which resolved within 1 week. Anterior uveitis was seen in 4 cases (13%) after 6 weeks 2 cases developed cystoid macular oedema and BCVA was 6/36 in both these patients.

1 patient (3.3%) developed hyphema and increased IOP which resolved with treatment. 1 patient had persistent corneal oedema in spite of treatment 6 weeks postoperatively and had BCVA of 6/36.

1 patient (3.3%) was seen with IOL decentration on 1st postoperative day and was taken up for surgery on next day for repositioning IOL. 1 patient (3.3%) developed retinal detachment after 6 weeks and was treated surgically for retinal detachment and had BCVA of 2/60.

No complications were noted in patients with in the bag PCIOL implantation. This may be due to the disparity in number of patients in the three groups.

A large prospective randomised clinical trial is required to determine the small differences in visual outcome and complication rate.

CONCLUSION

In this study, secondary intraocular lens implantation in the posterior chamber was found to have the following outcome:

- 1.** Secondary intraocular lens implantation in the posterior chamber was a safe and effective method of correcting aphakia with a better visual outcome.
- 2.** It avoids the disadvantages associated with spectacles and contact lens usage like anisokonia etc.
- 3.** Secondary intraocular lens implantation in the posterior chamber is superior to ACIOLs and iris fixated IOLs as it decreases the complications like bullous keratopathy, UGH syndrome, iritis, CME etc.

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1. Name:
2. Age:
3. Sex:
4. IP number:
5. Address:
6. Date of Admission:
7. Date of Surgery:
8. Date of Discharge:
9. Presenting Complaints:
 - Diminution of vision:
 - Duration:
 - Other complaints:
- 10.Past History:
 - H/o diabetes mellitus
 - H/o hypertension
 - H/o trauma
 - H/o heart disease
 - H/o bronchial asthma
 - H/o any other systemic illness
- 11.Previous Surgical History:
 - Indication:
 - Surgical Procedure Done:
- 12.Preoperative visual acuity:
 - UCVA: BCVA:
- 13.Preoperative Ocular Examination:
 - Facial symmetry:
 - RE LE
 - Extraocular movements
 - Eyelids
 - Conjunctiva
 - Cornea
 - Anterior chamber
 - Iris

Pupils

Lens

Presence of PC or

Anterior capsular remnants

Fundus

IOP

14.Diagnosis: RE LE

15.IOL Power Calculation (SRK formula)

K₁ reading

K₂ reading

Axial length

IOL power

16.Surgery:

Name of the Surgeon:

Operative Procedure done:

17.Intraoperative Complications

Descemet's Membrane Tear

Vitreous Haemorrhage

Retinal Detachment

Others

18.Post Operative Evaluation

a. Day 1:

Wound:

Cornea:

Anterior Chamber:

Pupil:

IOL:

BCVA:

b. 1st week

Wound:

Cornea:

Anterior Chamber:

Pupil:

IOL:

BCVA:

c. 1 week

Wound:

Cornea:

Anterior Chamber:

Pupil:

IOL:

BCVA:

d. 6 weeks

Wound:

Cornea:

Anterior Chamber:

Pupil:

IOL:

BCVA:

INFORMED CONSENT

I agree to undergo intraocular lens implantation in the right eye/left eye under local anesthesia. I have been informed about the technique and complications of the procedure.

Date:

Place:

Patients signature/

Thumb impression

KEY TO MATER CHART

M	–	MALE
F	–	FEMALE
RE	–	RIGHT EYE
LE	–	LEFT EYE
BCVA	–	BEST CORRECTED VISUAL ACUITY
AL	–	AXIAL LENGTH
CSIOL	–	CILIARY SULCUS FIXATION IOL
SFIOL	–	SCLERAL FIXATION IOL
PCIOL	–	POSTERIOR CHAMBER IN THE BAG IOL
AU	–	ANTERIOR UVEITIS
CE	–	CORNEAL EDEMA
SK	–	STRIATE KERATOPATHY
ID	–	IOL DECENTRATION
HY	–	HYPHEMA
GL	–	GLAUCOMA
CME	–	CYSTOID MACULAR EDEMA
RD	–	RETINAL DETACHMENT

MASTER CHART

SL.NO.	NAME OF THE	AGE	SEX	IP NO.	DIAGNOSIS		PRE OP BCVA	k1	k2	AL	IOL POWER	CAPSULAR	PROCEDURE	POST OP BCVA			COMPLICATIONS		
	PATIENT				RE	LE	OF OPERATING EYE					REMNANTS		DAY 1	1 WEEK	6 WEEK	DAY 1	1 WEEK	6 WEEK
1	Malaiyathal	74	F	46329	Aphakia	Cataract	6/24	46.5	47.5	22.21	18.5	Present	CSIOL	6/12	6/6	6/6			
2	Kuppathal	52	F	48135	Cataract	Aphakia	6/24	45.62	48.87	22.29	17	Present	CSIOL	1/60	6/36	6/36	AU	AU	CME
3	Valliyammal	70	F	61955	pseudophakia	aphakia	6/36	43.75	46.75	22.21	20	present	CSIOL	6/9	6/6	6/6			
4	Pappathi	70	F	68214	Pseudophakia	Aphakia	6/24	46.75	49	21.9	19.5	Absent	SFIOL	2/60	6/24	6/9	AU	AU	
5	Subramani	55	M	70859	Cataract	Aphakia	6/18	47.25	48.12	22.06	20	Absent	SFIOL	6/36	6/9	6/6	CE		
6	Palaniyammal	65	F	72651	Cataract	Aphakia	6/18	42	45.75	22.83	21.5	Present	CSIOL	6/24	6/6	6/6	SK		
7	Nataraj	68	M	73465	Aphakia	Pseudophakia	6/6	44	45.75	23.14	19.5	Absent	SFIOL	6/18	6/9	6/6	CE		
8	Vasanthi	42	F	2234	Aphakia	Cataract	6/9	45	46	19.74	30.5	Absent	SFIOL	6/12	6/6	6/6			
9	Nagaveni	56	F	4341	pseudophakia	Aphakia	6/60	44.12	47.5	22.68	20	Present	CSIOL	6/18	6/12	6/6	SK	SK	
10	Palaniyammal	70	F	4357	Aphakia	Pseudophakia	6/36	46.25	50.5	21.59	21.5	Absent	SFIOL	6/18	6/6	6/6	ID		
11	Kasi	65	M	6844	Aphakia	Cataract	6/24	42.75	44.5	22.21	23	Absent	SFIOL	6/36	6/9	2/60			RD
12	Arumugam	64	M	8231	Aphakia	Pseudophakia	6/24	42.75	43.5	24.07	19	Absent	SFIOL	6/36	6/12	6/9	HY, GL	GL	
13	Kaliyammal	70	F	9101	Pseudophakia	Aphakia	6/12	46.12	50.12	21.59	21.5	Absent	SFIOL	6/12	6/6	6/6			
14	Chinnamal	70	F	10920	Cataract	Aphakia	6/18	43.5	44.25	22.79	21.5	Present	CSIOL	6/18	6/6	6/6	CE		
15	Raju	60	M	11297	Cataract	Aphakia	6/18	45.5	45.87	22.76	20	Present	PCIOL	6/18	6/6	6/6			
16	Premavathy	60	F	14699	Aphakia	Cataract	6/12	44.12	44.87	21.27	26	Present	CSIOL	6/9	6/6	6/6			
17	Rangaraj	56	M	21315	pseudophakia	Aphakia	6/60	45.62	46.87	21.9	23	Absent	SFIOL	6/24	6/9	6/9	SK		
18	Ravathal	65	F	20192	Aphakia	Pseudophakia	6/18	44.62	47.5	23.45	16.5	Absent	SFIOL	6/12	6/6	6/6			
19	Natchimuthu	60	M	21779	Aphakia	Pseudophakia	6/18	42.5	45.5	23.76	19	Absent	SFIOL	6/18	6/9	6/6			
20	Eswaran	62	M	23363	Cataract	Aphakia	6/24	42.12	44	23.45	21	Absent	SFIOL	3/60	6/36	6/36	AU	AU	CME
21	Nagammal	51	F	26254	pseudophakia	Aphakia	6/24	46.5	46.87	22.21	20.5	Present	CSIOL	6/12	6/6	6/6			
22	Unnamalai	70	F	24681	Aphakia	Cataract	6/24	44	46.25	22.83	25.5	Absent	SFIOL	6/18	6/9	6/6	SK		
23	Savithri	60	F	27915	Aphakia	Cataract	6/12	45.85	47.12	21.52	23.5	Present	PCIOL	6/24	6/6	6/6			
24	Parvathy	61	F	34767	Aphakia	Pseudophakia	6/18	43.75	45.25	23.37	19.5	Present	CSIOL	6/60	6/24	6/24	AU	AU	
25	Mariyayi	60	F	40279	pseudophakia	Aphakia	6/24	45.75	45.5	22.1	19	Absent	SFIOL	6/18	6/6	6/6			
26	Alimuthu	53	M	51146	Aphakia	Cataract	6/18	41.25	44.5	22.83	22.5	Absent	SFIOL	6/36	6/12	6/9	CE	CE	
27	Ganthimathi	60	F	54379	Aphakia	Pseudophakia	6/12	43	44.75	22.83	21.5	Present	PCIOL	6/12	6/9	6/6			
28	Mary	70	F	62340	pseudophakia	Aphakia	6/12	41.75	44.5	24.07	19	Absent	SFIOL	3/60	6/36	6/36	CE	CE	CE
29	Karuppusamy	65	M	59937	Aphakia	Pseudophakia	6/18	42.5	43.75	23.45	20.5	Present	CSIOL	6/12	6/6	6/6			
30	Kallan	75	M	61964	Aphakia	Cataract	6/24	44.25	47.25	21.59	24	Absent	SFIOL	6/12	6/9	6/6			